

## PSYCHOPATHOLOGY AND SOCIAL PSYCHOLOGY

## PART I. THE HISTORICAL METHOD

BY J. T. MACCURDY

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## INTRODUCTORY NOTE

This article comprises the introductory chapter to an unfinished book by the late Dr J. T. MacCurdy, which he had proposed to entitle *The Psychopathology of Politics*. It will be followed by two further articles comprising selections from later chapters. Although this method of editing entails considerable shortening of the original text, I have endeavoured to present MacCurdy's argument as coherently as possible and to retain wherever possible his characteristic style.—O. L. ZANGWILL.

## I. INTRODUCTION

To-day one frequently hears the opinion expressed that some party, some country—or indeed the whole world—has 'gone mad'. Is this just a florid term of disapproval of the politics discussed or is the judgement one that can ever be scientifically justified?

By due legal process a man may be certified as having so far lost control of his thoughts and actions as to be incapable of attending to his own affairs or to have become a menace to himself and others. He is then 'insane'. Apart from certifiable lunacy, the psychiatrist recognizes mental abnormalities that interfere with the patient's adaptation, although not rendering him utterly incompetent. In making his diagnosis the psychiatrist, like a layman, uses as a standard of comparison the hypothetical normality of the average member of the community. We all differ in our predilections, prejudices, manners and beliefs. Individual differences are encouraged—'everyone must be allowed to call his soul his own'—even eccentricities may be tolerated, but there is a limit, never precisely defined, beyond which idiosyncrasy becomes abnormality. This limit is not set by psychiatrists, or by a court, but is a consensus of opinion characteristic of the age or of the community. In comparison with this standard, individual anomalies of belief or behaviour are judged to be allowable variation or else actual lunacy. In this aspect of the problem, therefore, it is clear that a social group can be judged to be mad only if there is available some generally recognized world-wide standard of normality for communal behaviour. Such a Utopian fellowship is a dream for the future. Perhaps, rather, we should say that there are many dreams and that that is just the trouble. Each community, whether it is a subgroup in one country or a nation in the world as a whole, seeks to impose its standards on the whole community. Were there but one dream the required social norm would already be in existence. No one knows as yet what a 'sane' world would be like. It might well be that a blue-print of a normal world would look mad to any one of us to-day because it would display socialized man as flagrantly different from what he is. Someone has said: 'There is too much human nature in the world to-day'. Speculation about human society if man were different from what he is may not be mere fireside whimsy; it may contain elements of practical import. But it belongs to philosophy or theology and not to psychological



science. Psychology has to study man as he is and confine prediction to cautious, tentative and short-term extrapolation of its findings.

So we must dismiss the notion of applying legalistic method to our problem, i.e. judging of the normality of groups as the community estimates the conformity of its members to a locally accepted standard. Fortunately, however, there are other methods of approach. When a psychiatrist testifies that a patient is suffering from delusions he is merely making a lay judgement, a judgement that is confirmed, or confirmable, by a magistrate, judge or jury. A relative, a neighbour, a policeman or an employer might offer similar evidence. But the psychiatrist on the basis of his specialized training is entitled to go further. He can say two things. First, 'I have studied this patient's mental processes and I find them to be of an abnormal character', and secondly, 'This abnormality is liable to render the patient a danger to himself or others'. Is it reasonable to expect that we may be able to make judgements about groups similar to these which the psychiatrist makes about his individual patient? To give an affirmative answer to this question is the object of the present essay.

## II. THE CLINICAL METHOD

The psychiatrist, when he studies an individual, analyses symptoms so as to show them as expressions of various mental factors. These factors are in turn ascribed to disease of the brain (in a physical sense) or else are found to be peculiar trends in the personality. The latter are traced back to their origins in childhood and it is seen how they evolved from inherited tendencies, were modified by environmental influences and assumed unbalanced proportions in the adult personality. The psychiatrist, having this understanding of the disequilibrium, not only explains what determines the symptoms but is able to predict with tolerable accuracy the outcome of the disease, to foresee the problems which will be too much for his patient. This is no rating of the subject against a scale of hypothetical normality but *an individual biography*. It is a study of how one man's character was formed under the impact of his particular experiences—experiences that came unbidden or experiences that were sought because he was the kind of man he had become. No two people are alike and every biographic study is unique. Nevertheless, the psychiatrist is guided in his research by analogies found in other cases. Abnormal tendencies are indeed prone to group themselves into recognizable categories which are the various mental diseases or reaction types.

An important phenomenon is to be noted here. The more a psychosis has developed, the easier is it as a rule to make a specific diagnosis, to predict the outcome or to foresee the future behaviour of the patient. Bizarre though the actions and ideas of the psychotic may seem to a layman, his mind is really operating in fewer and narrower grooves than that of his normal neighbour. This relative simplicity makes for a relatively fuller understanding. If a man is interested in his job, in his church, his political party, playing games, gardening, reading, biography, playing with his children and bird-watching, what are the chances of making a correct guess as to how he will spend the next Bank Holiday? But if he contracts his interest into only one of these channels the chances would be in favour of making an accurate prediction; so if psychiatric method be applicable to the study of groups as it is to individuals, it may be reasonable to hope that the detection of 'social psychoses' will be accompanied by an increased ability to predict the nature of social changes.

Every human being has a dual nature; on the one hand, he is an animal which has to



win a livelihood and is under an urge to propagate its species; on the other hand, he is a human with intellectual, moral and aesthetic interests that he strives to enlarge. Exactly the same statement can be made about any social group. It has its material necessities that must be secured if it is to survive, and it has its objectives, its ideals and its programme. Taken together, these constitute its *raison d'être*. In either the material or the cultural field the individual or the group is surrounded by others who are potential rivals or potential co-operators. Both the individual and the group are engaged in what the biologist calls *adaptation*—adaptation to both the non-human and the human worlds. It is a commonplace that success in adaptation depends, on the one hand, on the clemency or hostility of the environment, or on the other, on the capacity of the organism to change its *modus vivendi* as circumstances alter. This modifiability may be exhibited in either the bodily or the mental field. The man who is always being incapacitated with minor infections has poor stamina. The man who is cast down and rendered ineffective by some mischance has, we say, a weak character. Or so-and-so will never get on because he always makes enemies, is too easy-going, is over-conscientious, has an inferiority complex, or what not. These are all judgements about mental competence referring not to some socially accepted norm but to the individual's capacity to cope with life's problems. *The strength or weakness of groups may be similarly judged.*

Such judgements are by no means unknown; indeed to make them is the task of many historians. The moment history ceases to be a collection of unrelated facts and an effort is made to collate events in a meaningful sequence, the moment the events are made to tell a story, the biographic method I have been describing comes into play. Because history is engaged in studying human behaviour it belongs to the psychological sciences. Similarly, economics can be rated as a psychological discipline dealing with human behaviour in relation with trade. In neither subject can the observer control his material or arrange valid experiments. He can merely record what happens and attempt to deduce laws as to what governs the sequences witnessed. If these laws run counter to those of anthropologists, sociologists and clinical and experimental psychologists, then there is something wrong somewhere. Observation in one or more of the fields has been too scanty or inaccurate or the reasoning applied to the data has been faulty. The nature of man as a social animal will be adequately understood only when principles worked out in one field are tested and applied in the others. The psychologist cannot be an historian, an anthropologist, or an expert economist, but the work of each specialist will be incomplete unless and until he is inspired and criticized by his brothers. Specifically, so far as the present essay is concerned, there will be an attempt to show how psychiatric method may be applied to the problem—essentially an historical one—of understanding how groups fail or succeed in adaptation.

Implicit in diagnosis is prognosis, provided the diagnosis is meaningful. Laboratory scientists who can afford to work for generations before propounding ultimate laws of nature are prone to deprecate the activities of doctors as 'unscientific' because conclusions are drawn from data too incomplete to justify certainty. In this they are confusing the enunciations of final principles with taking action on the basis of such knowledge as already exists. Every time a doctor makes a diagnosis, predicts the outcome to be expected and prescribes treatment designed to modify the course of the disease, he is not promulgating some ultimate law of pathology, nor does he pretend to do so. He is merely performing an experiment that is as intelligent as his knowledge and wit allow. This is precisely what the



laboratory worker does in the course of his research. His 'diagnosis' is a hypothesis to test which he designs an experiment that is as crucial as his knowledge and wit allow.

### III. PSYCHOPATHOLOGY AND POLITICS

The above polemic has direct relevance for the present study. Engineers had made dynamos and electric motors before electrons were thought of. Doctors have to treat patients in the light of such theory as they have—even by rule of thumb when no theory is available. A doctor who refused to treat any patient whose disease he could not fully understand would have a small practice—and rightly so. Should psychopathology or social psychology be allowed no part in the consideration of political problems because its laws have reached no finality? Some psychologists would say so. If such critics hear politicians pronounce confident judgements about social phenomena whereof no man could have final knowledge they say only charlatans are thus dogmatic. To stray in the field of political action is to be polluted. If that attitude had ruled in the past chemistry would never have evolved from alchemy nor medicine emerged from magic. The professional politician, on the other hand, is liable to be as little hospitable to volunteer assistance as scientific pedants are prone to offer it. Following an ancient custom (based it seems on the assumption that electors are to be hypnotized and not consulted) politicians display complete knowledge of the present and a divine certitude as to the future. Such an atmosphere stifles the scientific spirit which abhors dogmatism and seeks progress through tentative experiment. The politician will welcome a scientist who puts his *imprimatur* on some dogma but not one who offers only hypothesis and who refuses to exclude from analysis of a problem any factor until it has been proved to be unimportant. Intelligent patients are beginning to be suspicious of physicians with Olympic wisdom and it may be that the days of the politician who speaks from Sinai are also numbered. If so, the statesman of the future will compound his prescription out of more ingredients than wish-fulfilments and bribes to what he hopes is the majority of the electorate. In that day he may use some of the methods and concepts of psychiatry. He will then look on the life of the social organism not as a static unit that can be enlarged or contracted at will but as a constantly evolving process whose to-day is equally the consequence of yesterday as it is the promise of to-morrow. Treatment—i.e. legislation for to-morrow—that is not based on diagnosis of how yesterday made to-day will be anathema. At the same time, political panaceas will be as popular as amulets which ward off disease—no more and no less.

Finally, an answer should be made to one possible objection to the suggestion that policy-makers should use the clinical method in approaching their tasks. It might be said that the rank and file of any organization, either sectional or national, is too stupid or too slothful to consider qualified statements; it wants nothing but simple generalizations pronounced with finality. If leaders are to use a scientific approach to their problems they will propose legislation tentatively, arguing that it will probably be effective but not guaranteeing its success. The common man, the critics will say, will have none of this; he will inevitably listen only to the demagogue who prophesies as if immune to human error. Perhaps this is true, but if so we should discard the clumsy machinery of democratic government, drop our illusions and deliver ourselves up to autocratic efficiency. Before doing so, however, we should glance at the history of dictators. They have all been men of some intelligence but how many have exhibited ultimate wisdom? Does not much of



present woe come from the policies and actions of those who know all the answers, including answers to questions that are, at the moment, unanswerable in any scientific sense? Perhaps some of our troubles are due to a generation of politicians who have talked about 'democracy' but have not truly believed in it, and politicians who, in order to gain or retain power, have flattered those they represent and who have, as it were, gulled the investor with glittering promises, but who have never trusted the electorate with the truth. A democratic leader should be a teacher as well as a chosen representative; he should have as one of his tasks the training of political thinking. Either an effective majority is potentially capable of developing intelligent opinions about policy or else it is not. If it is not, democracy should be abandoned. If it is, then the potentiality should be nourished and not starved or perverted. A good teacher does not flatter his pupils by telling them they are intelligent and then insist on rote learning of formulae, denying to the class any discussion of what the formulae mean. The teacher who equips his pupils merely with a patter of slogans turns out intellectual robots who are much more dangerous than those who consider themselves 'uneducated' and exhibit intellectual humility. A pedagogue with omniscient pose does not cultivate potential judgement; whereas the expert who explains why he is unable to reach final conclusions encourages critical thinking. The politician whose stock in trade is a collection of axiomatic principles is not, perhaps, the believer in democracy he affects to be.

#### IV. SUMMARY

1. The possibility of a valid social psychopathology is examined in the light of current conceptions of mental abnormality. It is argued that the social psychologist might reasonably expect to make judgements about groups similar to those made by the psychiatrist about individual patients.
2. The nature of the biographical method in psychiatry is examined and its parallels with the method of the historian are discussed. In both cases, it is argued that the aim is to deduce laws governing the sequences of events witnessed or recorded and that it is necessary to proceed despite the lack of data sufficiently complete to justify final certainty.
3. Some comments are offered on the place of clinical and historical method in practical political activity. It is argued that a more dynamic conception of social processes and a consideration of evolutionary and historical principles are essential in the training of political thinking and in the initiation of social change.

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## PROVOCATION TO ANGER AND THE DEVELOPMENT OF ATTITUDES OF HOSTILITY

BY PETER McKELLAR

I. *Introduction* (pp. 104–105). II. *Method of investigation* (pp. 105–106). III. *Data obtained* (pp. 106–111). IV. *Discussion of results* (pp. 111–113). V. *Conclusion* (p. 114). *References* (p. 114).

### I. INTRODUCTION

The assumption that 'frustration' is responsible for 'aggression' exercises a very considerable influence upon psychological theory and its applications, and even upon experimental investigation into this aspect of human relationships. A question may be raised of whether this influence is proportionate to either the meaning or empirical validity of this hypothesis. Dollard, Miller, Doob & Sears (1944), at the Yale Institute of Human Relations, may be regarded as the most explicit recent exponents of this 'Frustration Aggression Hypothesis'. It is held that: 'The existence of frustration *always* leads to some form of aggression' (p. 1; *italics mine*). The authors further contend 'that the occurrence of aggressive behaviour *always* presupposes the existence of frustration' (p. 1; *italics mine*). The central concept of the hypothesis, 'frustration', is defined as 'an interference with the occurrence of an instigated goal response at its proper time in the behaviour sequence' (p. 5). Sound formal and logical criticisms of Dollard's formulation of this viewpoint are advanced by Sargent in a recent paper (Sargent, 1948). The present investigation suggests equally serious weaknesses of the hypothesis from an empirical rather than formal and terminological aspect. An attempt will be made to show that although 'frustration', as defined above, may have a certain limited explanatory value in accounting for the aggressiveness of simple anger, it fails to provide an adequate explanation of dislike, contempt, ambivalence and hatred. These give rise to some of the more extreme manifestations of human aggressiveness. It is further suggested that, since anger of short duration differs from the more enduring hostile attitudes in certain important respects, an hypothesis of this type has a very limited value and serves to confuse rather than to clarify psychological theory and research in this field.

The antecedents of the hypothesis may first be considered. Under the influence of Freud the concept of 'frustration' has been much stressed in medical psychology. The hypothesis, however, appears at a much earlier date than psycho-analysis. Dollard contends that such a viewpoint is implicitly assumed in the economics and sociology of Marx. Marx does in fact refer to 'the social antagonisms that result from the natural laws of capitalist production' (Marx, 1906). It seems reasonable to suppose that it is implied that such antagonisms arise from the thwartings which Marx believed 'Capitalism' to impose upon human relationships. At a still earlier date Rousseau had an essentially similar viewpoint. Rousseau held that the institution of property and the restrictive influences of civilization served to augment and increase the primary aggressiveness of primitive man. In the state of nature strife may arise from sexual rivalry, but greater opportunities for such strife result from the emergence of complex duties, personal possessions and status relationships. Every intended injury becomes an affront in that



a person perceives in such action contempt for his person, his belongings and his status. The earliest anticipation of the 'frustration' view of aggressiveness with which the writer is acquainted is that of Plato. In the *Symposium*, Plato provides a partial explanation of the hostility of Alcibiades for Socrates in terms of sexual frustration (Plato, *Symposium*, 213ff., especially 219). This reference is interesting in that Plato's account also uncovers the relations of this hostility to injured self-esteem. Alcibiades is not only frustrated (in Dollard's sense), but in addition feels humiliated as a result of his rejection by Socrates. This aspect of the provocation of anger and the development of hostile attitudes is, to a large extent, obscured by the omnibus use of the concept of 'frustration' to account for human aggressiveness in general. Both Plato and Rousseau (like many other early authors) present anticipations of the frustration hypothesis, but both draw attention also to what seems to be another important aspect, the personality, self-esteem and status of the subject. It thus becomes necessary to reconsider aggressiveness in the light of this other aspect, which has very largely disappeared from much recent psychological thought on this topic. In particular we may consider self-esteem and status in their relations to the more enduring tendencies to dislike, to hold in contempt and to hate.

## II. METHOD OF INVESTIGATION

The first inquiry undertaken was concerned with anger and its provocation. A second investigation centred primarily on factors associated with the development of hostile attitudes such as dislike, contempt and hatred. Procedures adopted may be summarized:<sup>1</sup>

(A.) A preliminary study was attempted by the writer of anger arising in himself, in his own personal relations. The attempt was made to record circumstances relating to every case of his own anger which occurred in a period of 47 consecutive days. A hundred cases of anger were obtained in this way. Circumstances relating to such anger were noted down as soon as possible after the occurrence of the incident, in a note-book which was carried for this purpose. This introspective study was planned in connexion with a second investigation of a questionnaire type, involving 100 men and 100 women. Each was required to record two recent instances of anger and related circumstances. The mean age for the group was 31.20 years, and the standard deviation was 11.58. A wide age and occupational range was chosen deliberately. Those who took part were members of adult education classes in the London area. Data obtained, strictly speaking, apply only to this population, but are at least highly suggestive of wider application.

(B.) A second investigation of a more intensive (rather than extensive) type centred on hostile attitudes and the factors responsible for these. Procedure involved continuous interviewing over a period of approximately one hour. This was supplemented by free association and active imagination techniques.<sup>2</sup> In the preliminary interview the subject was asked to call to mind some person for whom he felt 'strong aversion'. As a precaution against social inhibition he was asked not to name this person, but to refer to him merely by a letter or initial. A standardized procedure was adopted throughout, both in general

<sup>1</sup> Another aspect of the data of the first of these investigations was dealt with by the writer in a previous paper (McKellar, 1949).

<sup>2</sup> The 'active imagination' procedure was intensively used by Jung, as a supplement to free association and dream analysis. A recent publication by G. Adler discusses this method and its applications in some detail (Adler, 1948).



and in the specific questions asked. The first stage involved a preliminary interview. Then followed a period of free association and a second interview to elicit details of memories reactivated by such association. The subject was now asked to imagine actively an incident involving himself and the object of hostility. He was asked to make up a story about what he would have liked to have happened, rather than what did happen. A concluding interview then followed. This centred on the data revealed by the active imagination procedure, and involved additional questions relating to the subject's present feelings towards the object of hostility and his probable feelings and overt behaviour should he meet this person on leaving the interview room. In all thirty individuals were subjected to this standard procedure. Two dissimilar groups comprising fifteen male conscript soldiers and fifteen female university students made up this population. This selection was intentional. The aim of the study was not to compare the two groups, but rather to consider tendencies common to both in spite of differences in major variables such as sex, education and intelligence. Tendencies common to two such groups may be supposed to have wider general application than tendencies found in a single homogeneous group. Mean age for the army subjects was 20.7 years, and for the students, 22.4 years. Three of the soldiers and two of the students were married.

It will be assumed in the following discussion that 'aggressiveness' describes activity of an attacking type. This is taken to include actual overt attack, impulses to attack, and thoughts and images of an attacking type. Such 'aggressiveness' may arise from anger which is almost entirely the product of immediate provocation. In contrast to this it may arise from the more enduring hostile attitudes, as a result of merely perceiving or thinking about the object of such attitudes. 'Hostility' is taken in this paper to refer to predispositions likely to lead to overt words and actions or thoughts and images, so far as these are of a type which may legitimately be termed attacking. 'Hostile attitude' is used generically to refer to the higher or lower degrees of intensity of hostility in so far as these are organized around the perception or ideational representation of some object. A disproportion between immediate provocation and response is apparent in many forms of aggression. Such disproportion is more apparent in the case of aggressiveness against the objects of love and ambivalence on the one hand, and of hatred, dislike and contempt on the other, than in the case of aggression towards a stranger whose welfare or otherwise is ordinarily of little importance to the subject, but who may provoke anger of short duration. The first investigation was concerned with such anger of short duration, the second with hostile attitudes of dislike, contempt and hatred. The validity of the frustration hypothesis as an explanation of these two somewhat different sources of aggressiveness will be examined critically in the light of the two investigations.

### III. DATA OBTAINED

A consideration of the hundred instances of anger obtained in the introspective investigation revealed that interference with goal-directed behaviour accounted for some but not all of such anger. Analysis of the 379 instances obtained from the 200 subjects of the questionnaire study supported this finding. Results were found to be classifiable in terms of two large categories. The basis of this classification will be considered briefly. A human individual is a living organism, superimposed upon which is a system of relations with other organisms, abstract values and material possessions. These relations give emotional importance to external persons and things as well as to mere self-preservation



and biological survival. Each individual is thus motivated by primary self-preservative and reproductive needs, but also by needs arising from this secondary system. Out-going primary or secondary need-determined behaviour may be thwarted and aggressiveness may result. On the other hand, the subject may apprehend the attitudes and activities of others as detrimental to the underlying system of the personality from which his motivation arises, rather than to the mere immediate goal-seeking activities themselves. Recorded instances were thus found to be classifiable in terms of the two categories: (1) anger arising from the interpretation of a stimulus situation as interfering with the pursuit of a goal, under the influence of some primary or secondary need; (2) anger arising from the interpretation of a stimulus situation as involving the imposition of physical or mental pain, in short, a felt encroachment upon values, possessions, status or habitual relations and attitudes towards other persons. Since the first category relates to interference with need-determined behaviour and the active pursuit of goals, these may be referred to as 'need situations'. Missing a bus, a tube or a train were frequent examples of such anger provocation in the data studied. Since the second category relates rather to the welfare of the individual as an organism, as a member of groups, and in his relations to other

Table 1. *Anger provocation: questionnaire study*

|                                  | Instances | Percentage   |
|----------------------------------|-----------|--------------|
| Need situations                  | 177       | 44.25        |
| Personality situations           | 202       | 50.50        |
|                                  | <hr/> 379 | <hr/> 94.75  |
| No second situation<br>described | 21        | 5.25         |
|                                  | <hr/> 400 | <hr/> 100.00 |

individuals and material objects, in short as a personality, these may be termed 'personality situations'. Criticism of ideas, work, clothing or friends constituted examples of such situations in the present set of data. It is the contention of this paper that the frustration hypothesis draws attention away from anger provocation of the personality situation type, while placing undue emphasis upon a rather specific kind of need situation.

Data obtained may be classified in terms of the predominance of one or other of these components. Although mixed situations occurred, what seemed to be relatively pure instances of these two types of stimulus situation were nevertheless frequent, and classification presented fewer difficulties than might be anticipated. In the introspective study need situations comprised 44% of the cases, personality situations 54%. The remaining 2% were unclassifiable admixtures of the two components (a total of 100 situations). Figures obtained from an assessment of the results of the questionnaire study were as shown in Table 1. These results relate to a group of 200 subjects, each of whom was asked to describe two recent cases of anger. In twenty-one instances (5.25%), the subject was only able to recall one such incident.

In order to show that data were classifiable in this way by independent judges, a subsidiary experiment was carried out. The writer selected from the first hundred questionnaires which came to hand a hundred situations which, in his judgement, fell clearly into



one or other of the two categories. Tetrachoric correlations between the assessments of the writer ('W') and of the two independent judges ('A' and 'B') were calculated:

*Agreement of assessments of judges*

|               | Correlation |
|---------------|-------------|
| Judge A and W | 0.932       |
| Judge B and W | 0.862       |
| Judge A and B | 0.752       |

The results show that the two broad categories distinguished are recognizable and can be assessed with a high degree of accuracy by independent judges. It may be stressed that mixed cases which involved elements of both types were excluded from this check investigation. It is not contended that there are no such mixed cases, but rather that there is an important type of anger provocation (personality provocation), which differs in important respects from thwarting, and that instances of this are distinguishable by judges other than the present writer. No significant sex differences appeared in the incidence of the two types of provocation which have been distinguished.

A distinction between two types of anger provocation emerged from this first investigation. The value of this distinction becomes even more apparent if considered in the light of the second investigation, the study of the nature of the factors responsible for enduring attitudes of dislike, contempt and hatred. *In no case were factors of the need type sufficient in themselves to account for the attitudes of hostility studied.* These sometimes appeared as contributing causal factors, but an additional and necessary cause involving some positive imposition of dissatisfaction, that is a component of the personality provocation type, was invariably present. An attempt may be made to consider such causes in somewhat fuller detail, and to classify the major factors responsible for the hostile attitudes. Admittedly, the causes of such attitudes are complex rather than simple, and the following table is thus over-simplified in this respect. We may emphasize that these data were obtained by continuous interviewing of an intensive type lasting approximately one hour, and that the special techniques of free association and active imagination were used to supplement ordinary introspection. In addition, each interview centred entirely on one social relation of the person studied. In many of these cases the subject was not merely talking about his feelings and emotions on an intellectual level, but was experiencing these with some intensity during the interview itself. Occurrence of hostile emotion was nevertheless compatible with good rapport, even though this hostile emotion was sometimes of high intensity. The subject had opportunity to express his hostile feelings against another person to an interested and attentive listener. Conditions of rapport were thus not merely good, but often extremely so, and always to such an extent as to render gross deception improbable. Attention has been drawn to a number of aspects of this type of 'delayed expression' of anger in the earlier paper referred to above (McKellar, 1949). Table 2 relates to the investigator's assessment of the most important single factor. All are regarded as representative of the personality rather than the need component. Sympathetic emotion played the main part in the last two cases listed. Attack by the object of hostility had been on some person other than the subject himself. Physical pain inflicted by the object of hostility proved to be a more prominent feature of these records than was anticipated. Bullying by a stronger person while at school was a frequent occasion of such pain. As Table 2 shows, mental pain in the form of humiliation



represented the largest single category in the case of the attitudes studied. The interview and accompanying free association period revealed that associations with the object of hostility tended to be almost entirely unpleasant. Thinking about such a person aroused memories of hurt and humiliation rather than of more pleasant affective experiences. We cannot, of course, underestimate the extent to which displacement of earlier hostility of childhood origin played its part in determining such attitudes. Dislike and hostility may well be 'over-determined' in Freud's sense of the term. Nevertheless, the question remains of the nature of the specific and necessary causes without which such attitudes do not arise. Circumstances related by the subjects were in every case something more positive and more traumatic than mere subjection to 'frustration'. Long-term frustrations of the type which psycho-analytic writers have attempted to relate to feeding and cleanliness training may explain the variable amount of hostility and aggressiveness to be found in different individuals. These do not in themselves explain specific hostile attitudes. Hurt and humiliation or fundamental threat to the personality and its values seemed to be necessary factors in the focusing of such hostility and aggressiveness upon some specific individual who is hated, disliked or held in contempt.

Table 2. *Main factor responsible for hostile attitude*

|                                    | Student group<br>(female) | Army group<br>(male) | Total<br>population |
|------------------------------------|---------------------------|----------------------|---------------------|
| Humiliation                        | 9                         | 5                    | 14                  |
| Physical pain                      | —                         | 7                    | 7                   |
| Threat to values                   | 6                         | 1                    | 7                   |
| Physical pain of another<br>person | —                         | 2                    | 2                   |
| Totals                             | 15                        | 15                   | 30                  |

A second feature of interest emerged. Results suggested that a second factor favourable to the development of hostile attitudes is unexpressed hostile emotion. Objective data on this point are furnished by the status of the subject as compared with the persons towards whom these attitudes developed. In eleven of the cases studied, the other individual had higher status than the subject. Apart from the possibilities of envy and jealousy it was evident that these relations were such as to render any really satisfying expression of experienced anger inexpedient, and to diminish the possibilities of successful defence of oneself, one's status and values. In a number of the other cases successful anger expression and effective self-defence proved to be again impossible, though by virtue of the personality of the object of hostility rather than his status. Sometimes this other person was an equal, but one who successfully assumed authority over the subject and was able to dominate him. Apart from the effect of such a relation on the self-esteem and security of the subject, it is reasonable to suppose that the experience of being powerless to make effective retaliation, to express anger and defend oneself against a more powerful individual, favours the development of lasting hostility rather than mere momentary anger.

Previous results relate to the stimulus aspects of aggressiveness and hostility. It is helpful also to consider the response aspect, that is the impulses to action which the subject feels towards a person whom he dislikes or hates. Such impulses are frequently retaliatory, and as such throw further light upon the stimulus aspect. In the case of revenge such retaliation is evident in relatively undisguised form. One of the subjects in



the present investigation told how he had suffered prolonged physical pain as a result of the actions of the person whom he now hated. This person was most meticulous in his malevolence towards the object of hatred. He wanted this person to experience exactly the same amount of pain, no more and no less, that he had himself experienced. Three other subjects related incidents involving being bullied by an older and stronger person. Each of these gave evidence of wishes for opportunities to impose similar suffering upon the object of their hatred. The active imagination records obtained for the group as a whole were interesting. In only three of these was there an absence of an aggressive motif. Seventeen of the stories involved imaginative aggression against the object of hostility, the other ten, aggression on the part of this person against the subject. The seventeen cases of imaginative aggression against the object of dislike, contempt or hatred are instructive if considered in detail:

*Aggression against object: Active Imagination*

|                       | Instances |
|-----------------------|-----------|
| Hurting of object     | 6         |
| Humiliation of object | 6         |
| Destruction and death | 2         |
| Verbal attack         | 2         |
| Aggressive withdrawal | 1         |
| Total                 | 17        |

The wish to hurt or humiliate proved to be far more frequent than the wish to kill or destroy. Further data on this point are evident from answers to the question: 'What would you like to do to this person?' Fifteen of the subjects wished to perform some malevolent act. Eleven wished merely to avoid the other person, and the remaining four revealed a wish to improve the relation in some way. Of the fifteen malevolent wishes only one was for the death of the other person. The most common malevolent wish was to hurt and humiliate rather than to destroy. A question arises as to whether this tendency was the product of benevolent or ethical restraining factors. To investigate this point the writer asked each subject to make his choice between killing and destroying or hurting and humiliating the object of hostility. Results obtained, particularly in the case of the higher degrees of malevolence or hatred, were highly interesting and suggestive. Illustrative remarks of another three subjects may be quoted:

I'd like to see the torment in her face. I'd like to hear her cry the way she's heard me. I'd still carry on....

I'd like to give him a dose of his own medicine. I'm now good with my fists.

Would like to torment her; have her crawling to me for mercy. If she died it would be a pity if I hadn't had opportunity to have a stab at her before she passed out.

These three expressions of hatred are the more interesting in that the death of the other person obviously matters less than his suffering a maximum amount of hurt and humiliation, preferably at the hands of the subject himself.

Shand contends that the end (aim) of hatred is destruction, and that destruction is not ordinarily the end of anger (Shand, 1914). It seems probable, on the contrary, though this is not at first sight apparent, that hatred seeks, in preference to destruction, a maximum of humiliation and suffering of the hated person. The death of that person is secondary to, and in the last essence incompatible with, this most characteristic aim of hatred. We may thus suggest, in opposition to Shand, that impulses to destroy belong to the warm-blooded



aggressiveness of anger, rather than to the cold and calculating malevolence of hatred and revenge. A disliked or hated person is not merely the source of obstruction which the subject seeks to remove, but rather one against whom retaliation is desired. A hated person is of too great an emotional importance to the subject for his mere destruction to be satisfying. This emotional importance arises from the experience of being hurt or humiliated by this other person. The subject wishes to impose similar hurt or humiliation in return for what he has suffered, or believes himself to have suffered, at the hands of his enemy.

#### IV. DISCUSSION OF RESULTS

The malevolent wishes of the subject against the object of his hatred, considered in the previous section, throw some doubt upon the supposed 'death wishes' of persons motivated by hatred. The actual death of a hated person may be highly incompatible with the real purposes of the one who hates. It may, however, be impossible to inflict like suffering upon the hated person, in reality. It is probable that it is very frequently inflicted in fantasy. The investigation also revealed that twenty-five of the thirty subjects studied asserted the moral inferiority of the object of their hostility; in eleven cases this assertion was made with considerable emphasis. These two tendencies considered together suggest the probability that a considerable amount of satisfaction has been derived by suffering humanity in an ideational way by the peopling of Hell (as a place of suffering) with the 'evil' objects of their hatred who have inflicted similar suffering upon them. We may note Fromm's comment upon Luther and Calvin, who did much to impose the conception of Hell upon subsequent European civilization. Fromm declares that they 'belonged to the ranks of the greatest haters among the leading characters of history' (Fromm, 1942, p. 28). This writer adds that 'their doctrines were coloured by this hostility', and 'could only appeal to a group itself driven by an intense repressed hostility'. Again, the sufferings of John Knox as a galley-slave are probably not irrelevant to the part which Hell played in the subsequent development of his religious teaching. It is contended, therefore, that the satisfaction associated with the overt or ideational aggressiveness of hatred involves important components of malevolent joy in the imposition of hurt or humiliation upon a person who has imposed similar physical or mental pain upon oneself. The satisfaction of anger, in its more momentary and typical forms, arises principally from the successful overcoming of obstacles, which the reinforcing effects of anger make possible.

These data relating to the response aspect of hostile attitudes provide suggestive, though not conclusive, support for the view that dislike and hatred arise from something more positive than mere restraint and thwarting of need-determined activities. The data show that the subject aims at inflicting suffering which is seen in part as retaliatory, and which may closely resemble the suffering he himself experienced and to which he attributed the development of his hostile attitude. A consideration of the situations which set up hatred or dislike suggested that 'need situations' and theories which emphasize them do not adequately explain the development of such attitudes, although they may have some bearing upon the aggressiveness of simple anger of short duration. Short-lived anger of this sort seems to be unaccompanied by the judgement of 'having suffered wrong' at the hands of a 'morally inferior' person, which is a feature of resentful anger and hostile attitudes. 'Resentment' is a useful term which implies what are two important criteria of such anger, namely long duration and the accompanying feeling of unjustifiably

inflicted hurt or injury. Such anger very readily seems to develop into hostile attitudes of even more enduring types.

An unwarranted assumption is often made by exponents of theories of the one-sided 'need provocation' type, namely that a person who is frustrated in a behaviourist or operationist sense, necessarily feels frustrated. Whether unmarried persons or religious ascetics are 'frustrated' (and thus prone to aggressiveness) or not seems to be ultimately a verbal issue, dependent upon the many meanings which both 'frustration' and 'aggression' have unhappily acquired. An illustration may be given. The writer was subject in a series of experiments which required complete food and drink deprivation for a substantial part of one day weekly, over a number of weeks. Objectively speaking the deprivation was very much the same on each of the experimental days. The writer was 'frustrated' in the sense defined by Dollard, and cited above. Actual 'feelings of frustration' varied greatly, however, and depended upon the writer's subjective orientation towards these objective conditions rather than on the conditions themselves. Interest in the experiment and the resulting development of aims compatible with deprivation of food and drink served to diminish the experience of frustration in the later stages and days of the experiments. Ascetics impose upon themselves deprivations of an essentially similar, though more severe sort. The religious and ethical goals of the ascetic, which parallel the aims of the writer in accepting these conditions for scientific ends, likewise serve to diminish very greatly the feelings of frustration. Thus it is evident that the frustration aggression hypothesis may mean either that 'aggression' results from deprivation (objectively defined frustration), or from the subjective experience of feeling frustrated. The introspections obtained in the study referred to suggest very strongly that there is not the simple one-to-one relation between the two which appears to be assumed by the workers of the Yale Institute and others, under the influence of an operationist methodology.

A further ambiguity emerges in the concept of 'aggression' as defined by Dollard and his co-workers in their major publication. Aggression is declared to be: 'An act whose goal response is injury to an organism, or organism surrogate' (Dollard *et al.* 1944, p. 8). This definition permits the authors to fluctuate between the alternative viewpoints that 'aggression' describes such acts, and that 'aggression' in some way explains the motivation (conscious or unconscious), which is responsible for such acts. The hypothesis that 'frustration' (whose ambiguity has already been noted) invariably results in behaviour which can be described as aggressive is obviously false. Many, if not all, of the mechanisms of ego defence and their overt manifestations, to which Anna Freud draws attention, and such widely different forms of experience and behaviour as anxiety, amusement, depression, apathy, and general desocialization, may be regarded as alternative results of 'frustration' in the loose sense in which it is defined by Dollard. The Yale workers thus shift their ground to the argument that the product of frustration is 'aggression', the latter concept seeming to involve the motivation which underlies actions of rather varying types towards other organisms. That this is so is possible but initially improbable. If such an argument is offered it begins to appear very much as the defence of a theory rather than as a constructive and profitable account of aggressiveness or of affective mental life more generally. The issue would be clarified very considerably if the two meanings of both 'frustration' and 'aggression', as defined and employed by the Yale workers, were recognized. We could then proceed to a study of the actual results of objective deprivation on the one hand, and of the subjective experience of 'frustration' on the other, without assuming



either to be manifestations of 'aggression'. Dollard's attempt to apply the hypothesis as an explanation of delinquency and crime, and to differences between cultures, is not very convincing if considered in the light of these criticisms. With reference, then, to the hypothesis that 'aggression' is the product of 'frustration', it may be pointed out that:

(1) The two central concepts of the hypothesis, 'frustration' and 'aggression', are both highly ambiguous. This ambiguity needs clarification before the hypothesis has value even as a more limited explanation of some forms of aggressiveness.

(2) If cleared of this ambiguity the hypothesis has greater relevance to anger of short duration than to resentful anger, hostile attitudes and the aggressive thoughts, impulses and acts which arise from these.

(3) The hypothesis distracts attention from the study of the interpretation which the subject places upon the actions and intentions of another person. Apprehension of such actions as aggressive, and such intentions as hostile, was found to be a necessary component in the thirty attitudes of hostility considered in the second investigation.

(4) Psychological theory and investigation of the emotions are confused by the implicit and unproved assumption that a highly varied range of emotional states are the products of 'aggression'. Alternatively, investigators are led to ignore these, and to consider only the emotional states resulting from frustration, into which hostility enters. Other subjective experiences and overt responses to frustration seem worthy of study in themselves, without the bias introduced into this field by the hypothesis.

The question raised as to the difference between a set of conditions as they are, and as apprehended by the subject, has relevance to any theoretical approach to the subject of aggression and its provocation. Anger is like fear in being ordinarily the result of apprehension of external conditions, and thus depends upon perception and judgement. Anger, resentment, dislike and hatred may arise from stimulus situations which are, or appear to an external observer, 'neutral' rather than provoking. Perception and judgement can be greatly distorted by projection of the subject's own unexpressed and unacknowledged hostility. Such distortion is grossly apparent in the ideas of reference of the paranoiac. They appear to be also a feature of both 'undue sensitivity' and scapegoating tendencies as they occur in normal mental life. In the present paper the view is maintained that hostility and aggressiveness arise from stimulus situations as cognized by the subject, rather than as they necessarily are, or appear to a behaviouristically-inclined observer. It is probable that 'need situations', as apprehended by the subject, bear a closer resemblance to their objective counterpart than do 'personality situations'. This would, to some extent, explain the close association which there has been between one-sided theories of the need type, and behaviourist and operationist methodologies. Such theories and such methodologies are equally unsatisfactory in that they obscure the important fact that interpretation of intentions and behaviour of another person as hostile and aggressive may also be an important factor in the occurrence of anger and hostile attitudes, and resulting aggressiveness on the part of the subject. This paper has therefore attempted to draw attention to such an interpretation as a component in much anger-provocation, and to suggest that it is a necessary factor in the development of resentful anger and the more enduring hostile attitudes of dislike, hatred and contempt.

## V. CONCLUSION

The hypothesis that aggressiveness results from frustration has been considered in its relation to anger and hostile attitudes. It has been rejected on the grounds of ambiguity, and as an over-generalization which obscures a component without which resentful anger and enduring hostile attitudes do not seem to occur. These give rise to some of the more striking and extreme forms of reactive aggressiveness. It is contended that the subject's apprehension of a stimulus situation, and not the situation as objectively defined, is of central relevance to anger provocation and the development of these attitudes. When such a situation is cognized by the subject as involving threatened or actual encroachment upon himself and his sphere of activities, aggressiveness and hostility are at least very frequent reactions on his part. *It is contended that aggressiveness arises as a result of what is felt to be encroachment upon the subject as an organism, as a personality, and in respect of his activities and external emotional involvements.* The subject may be angered by what he considers to be interference with his goal-directed activities. Such provocation does not, however, ordinarily give rise to lasting resentment and hostile attitudes, unless the subject interprets the situation as involving some more positive hurt or humiliation to himself, or to the persons and things which he values. In conclusion, it is suggested that experienced hostility tends to be proportionate to the intensity and recency of such physical or mental hurt, and inversely proportionate to the number of alternative associations with the object, opportunities for defence and retaliation, and effective anger expression.

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# THE COMPARATIVE ASSESSMENT OF PERSONALITY<sup>1</sup>

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I. *What do we mean by personality?* (p. 115). II. *How can we compare one individual with another?* (p. 116). III. *By what standards are observed traits to be assessed?* (pp. 116–117). IV. *Does the technique described help us to assess personality traits?* (pp. 117–122). V. *Conclusions* (pp. 122–123). *References* (p. 123).

## I. WHAT DO WE MEAN BY PERSONALITY?

The term 'personality' is sometimes used to refer to the hypothetical person as he is in himself. We say, for example, that what an individual perceives of a landscape is determined by his own personality. Used with this meaning, either 'person' or 'individuality' seems a more suitable word. The word 'person' can be used to refer to the human individual as he is in himself, whatever we may or may not know of him and however he may reveal himself to others. 'Individuality' can be used to refer to those qualities of a person which are unique to a single individual and distinguish him from all other individuals.

At other times, the word 'personality' is used as a more abstract, generic term. We speak of an 'artistic' personality, an 'epileptic', 'hysterical' or 'schizoid' personality, distinct from any particular person. The word is used to cover any groups of traits which appear to an observer to be characteristic of a given class of people. Any one person may possess many, but not necessarily all, the traits considered to be peculiar to his class. What we really do is to notice the extent to which a person appears to conform to, or differ from, the impression we have of people we assume to be of the same type.

When we speak, more or less qualitatively, of a 'typical' or 'unique' personality, or more or less quantitatively, of a 'strong' or 'weak' personality, we think not so much of the person as he is in himself, as of the impression he makes upon us compared with the impression we have of other people. This impression is determined partly by the person observed, but also by the natural capacities, acquired knowledge and personal interests of the observer. It is, however, all we ever know of him. We cannot know a person as he is in himself. We can only infer his nature from the effect his conduct has upon us. We cannot even know what really differentiates one individual from another. We can only observe a person's conduct and notice in what respects it resembles the conduct of other people and in what respects it appears unique.

In short, personality is essentially something we experience which, according to our natural capacities and as the result of our training and interests, we apprehend as characteristic of a particular individual or class of people. For this reason, I propose to use the word 'personality' to mean *'the qualities of a person's thought and conduct as they are apprehended by another person'*.

<sup>1</sup> A paper read at the British Association Meeting at Newcastle, September 1949.

## II. HOW CAN WE COMPARE ONE INDIVIDUAL WITH ANOTHER?

Two or more individuals, animate or inanimate, are always necessarily different. They only appear alike with respect to particular observable qualities which, in order to be compared, must be abstracted from and considered independently of those qualities in which the individuals differ. Scientific method consists chiefly in making a critical judgement concerning a particular quality to be observed, in controlling conditions so that its manifestations can be attended to, and in comparing individuals with respect to the quality under observation.

The Physicist compares individuals with respect to their length, mass or duration. It is by comparing them with respect to these qualities that he derives his concepts of quantitative equivalences. The Biologist compares the cycles of systematically organized activity occurring in individuals. It is by comparing the repetitive and novel qualities observed in these cycles that he derives his concepts of living activity. The Psychologist compares the various ways living individuals systematically organize their conduct with respect to their surroundings. It is by comparing the conduct of different persons in their responses to other individuals that he derives his concepts of personality.

The things people say are amongst the simplest forms of conduct the Psychologist can observe under controlled conditions and compare one with another. He can record people's remarks in a given situation. He can compare, match and sum the records he obtains and he can observe the frequency with which they occur.

## III. BY WHAT STANDARDS ARE OBSERVED TRAITS TO BE ASSESSED?

It is a simple matter to interpret the things a person says in accordance with some normative standard, speculative theory or particular type of personality. For the results to be convincing, we need to know the extent to which any remark is common to people in general, typical of a class or unique to one person. Questionnaires facilitate comparative studies, but the replies to them are usually pre-determined by the formation of the questions. Analytical techniques facilitate exploring certain aspects of a person's thoughts and conduct but implicit projection on the part of the analyst plays a role which is not under control.

The problem is that all psychology which is not purely introspective is really social psychology. What is called individual psychology is only properly understood as referring to a social group of two people. In this situation, the observer and the person observed are throughout intimately related one with the other. They are also so similar in their individual capacities and so influenced by their own particular interests that each plays a role in the situation which cannot be ignored. It must always be kept in mind that, in any test situation, there is always the test and the person giving the test as well as the person tested. We must be able to show the frequency with which any group of observed responses is characteristic of particular observers as well as of particular situations and persons observed. It can be seen that success in almost any comparative study of personality depends upon the degree to which this can be done.

Let us suppose that a number of records have been obtained for a given class of people. We need to compare them with respect to the observers, the test given and the people observed. In principle, the method is quite general. It can be applied to the comparative study of almost any kind of record which permits of being classified (1).



Each record is indexed according to the situation, the observer and the person observed. It is then divided into distinct statements regardless of any theory as to their interpretation. The statements in the first record to hand are then tabulated in a line from left to right. The second record to hand is treated in the same way, with the exception that each statement in it which resembles the statement in the one previously tabulated is entered vertically below it, while each statement which differs from it is entered in a fresh column to the right of the statements previously tabulated. Every record is treated in the same way. When the table is complete it shows, horizontally, all the statements forming one record and, vertically, the frequency with which similar statements occur in other records. The table is then re-arranged to show the relative frequency of the statements recorded. This is done so that the most frequent or 'common' appear on the left, followed by those which are more or less typical of a particular observer or class of people considered, and finally, on the right, those statements which are unique in the sense that each occurs once only.

For simplicity of exposition, the technique has been described as if all the statements to be compared were entered in order on a single table. In practice, it is more convenient to have each statement recorded at the outset on a separate index card. In this way, statements to be classified,<sup>1</sup> compared and grouped,<sup>1</sup> remain fluid and orderly throughout the enquiry.

Groups of similar statements can be given appropriate names. The name is simply a convenient label. Like the label on a bottle, to understand it, it is necessary to examine the contents. For example, a group name such as 'cheerfulness' is understood by statements in the group like 'her outstanding qualities are her gaiety and love of life'. It is the contents of the group—its consistency and the degree to which the various statements, placed together, confirm, elucidate and amplify each other—which are of interest.

The technique aims at assessing from the frequency of its occurrence the degree to which any reported quality can be regarded as typical for any given observer, kind of situation or class of people. Instead of demonstrating the degree to which any individual conforms to a preconceived type or exemplifies some previously accepted explanatory theory, it provides an experimental method of verifying the correctness of psychological theories and pre-conceived types of personality.

The technique has the advantage over many used for the comparative study of psychological records that the original qualitative information is retained throughout for critical comparison. According to one's predilections, the information can be arranged as a series of numerical tables, showing for each class considered the observed incidence of statements falling into the different groups. It can also be arranged as a qualitative description in which groups of statements reveal their own significance. In what follows, I shall confine myself to qualitative descriptions. These have been arrived at from quantitative comparisons of the kind I have described.

#### IV. DOES THE TECHNIQUE DESCRIBED HELP US TO ASSESS PERSONALITY TRAITS?

The technique has been used to compare changes in the 'Controlled Projection' (2) responses of boys and girls between the ages of 8 and 14 (3). The conclusions may appear obvious. It is the method which is of interest. It shows that boys, as they grow older,

<sup>1</sup> For clarity, the terms 'class' and 'subclass' are used to refer to the classification of records according to the persons considered. The terms 'group' and 'subgroup' are used to refer to the technique of grouping similar statements together. A 'group' is not, as in biology, a subdivision of a 'class'.

describe an increasingly well-differentiated interest in organized outdoor group activities, whereas girls are never very interested in group games. Young children are aware of disobeying their parents. Older boys are aware of being destructive. Girls are more aware of being disagreeable. Young children expect to be hit. Older children more often expect banishment. Both boys and girls seem to think that *they* are the chief causes of their parents' disagreeing with each other. Boys are inclined to blame father, but girls often feel that their parents simply fail to understand each other. Most children anticipate a mutual reconciliation, but little children frequently have no idea how this can be brought about. Both boys and girls are scared chiefly by their own imaginations. Girls are also frightened of harm occurring to someone else. Children say they boast to other children chiefly to show off. With their parents they indulge more in imaginary stories. They also tell them expedient lies, particularly older boys.

In bed, little children have pleasant fancies. As they grow older they think more about things which are going to happen. They cry less about their fears and more about their misdeeds. Girls more than boys cry because of injuries occurring to other people. Most children have nice dreams. Girls, far more than boys, as they grow older, say they have worrying dreams about their misdeeds or of being forsaken. Boys more often dream of catastrophes. Girls more than boys wish for living things to look after, but more than one in seven of all children wish for a reconciled, happy family, or friendship. Girls between the ages of 11 and 13 express a strong wish not to grow up. They wish chiefly to stay young and play or be looked after. Boys wish to grow up and go to work. In general, boys are chiefly interested in the things their hero does. Girls are more interested in their heroine's appearance.

Extending the same technique, we can build up, for comparative purposes, the boy's usual hero. As it is a composite picture, we will call him 'Norman'.

*Norman*, then, is any ordinary boy between 11 and 14 years of age, living in a town in an agricultural district where there are industries and a river.

Norman's hero likes outdoor games with his friends more than anything else. He gets into trouble for being disobedient and destructive or for getting dirty, and he is sent to bed. He makes his mother and father cross with each other but they usually make up their quarrel quite quickly. He and his friends know of secret birds' nests they can rob. He boasts to the other boys to show off and lies to his parents to get out of trouble. In bed, he thinks of what he has done and what he is going to do. If he cries, it is because he has been hurt. He has pleasant dreams and is awakened by noises. He wishes for a bicycle and wants to grow up and go to work.

Using the same technique, we can now show how far a description given by any one child resembles the description given by other children of his age and sex and where it differs.

*Ronald*, for example, is a boy of 13 who was sent to a Clinic for pilfering and truancy (2). He describes a hero who, like other boys, enjoys playing out of doors with his friends, is the cause of his mother and father quarrelling, thinks of his difficulties while in bed and wants to grow up and go to work. Of his twenty responses, however, seven were uncommon and five unique. These can be brought together. They show in what ways Ronald's hero is different. He dislikes being with 'the devil', because 'he makes you do evil things and keeps egging you on'. He gets punished because 'he hit a cow and chased some sheep'. When father tells him not to, he 'just looks sad'. His parents quarrel because 'he hit



another boy who wasn't well'. At first his father doesn't give him a good hiding but 'mother jaws father and so he does'. He shows his friend 'something he has stolen from a shop' and is frightened because 'the boy tells his father and his father tells his mother and he has to take it back where he stole it from'. He tells his parents 'he bought the book off another boy'. In bed, he thinks about 'the book he stole'. He dreams 'the people who own the shop are coming after him for it' and he wakes up frightened. He wishes 'that someone would take the book back and that he could stop telling lies'. He would like to use the money he is given in his dreams in order 'to be a good boy and get some pals and take the book back and buy it'.

The same technique was applied by Miss Kaldegg to a social study (4). In order to assess differences of culture pattern, she compared the 'Controlled Projection' response of German boys with those of English boys. She found German boys identified themselves with imaginary situations far more than English boys did and took them more seriously. She found English boys allowed more free play to their imaginations, showed no resentment to suggestions that parents quarrelled, referred less to corporal punishment for wrongdoing, more often suggested alternatives and tended, in general, to become more lenient as they grew older. She found German boys were more conventional in their ideas, and in their attitude to punishment became more drastic as they grew older.

Extending the same technique, Mr Foulds was able to compare the social backgrounds and 'Controlled Projection' responses of four clinical classes each consisting of twenty boys, with about the same mental ages of 11 years (5). He treated the responses characteristic of each class as if they were given by a single boy. For the purpose of comparison he called them 'Nervous Angus', 'Uninhibited Bob', 'Delinquent Charlie' and 'The Waif, David'.

*Nervous Angus* lives in a slum area of a highly industrialized city. He is about 11 years of age and of average intelligence. Because of a speech defect and as he is backward at school, Angus has been referred to the Child Guidance Clinic.

Angus's hero likes playing in the great outdoors with other boys and will have nothing to do with girls. He is very frightened of getting hurt and runs to his parents with tales about other boys. He is also very much inclined to nag and whine until he gets what he wants and when the good things come his way, he is disinclined to share them.

Bringing unique responses together, Mr Foulds showed that beneath this timorous, selfish, whining person, there was a second Angus. The boy tells tales about other boys but sometimes he would like to 'fight them'. He whines to his parents, but sometimes he would like to 'start his revenge' by telling them 'stories that would make them dream' and by 'getting his brother burned alive'. He is afraid of getting hurt himself but longs for 'adventures' when 'the other boy would fall down the trap'.

*Uninhibited Bob* lives in the block of tenements next to Angus. He and Angus are of about the same age and intelligence, but at school Bob does rather better when he condescends to attend. Socially, he shows off, is an habitual liar, has temper tantrums, is extremely aggressive and quite frequently steals.

Bob's hero likes athletic games. He boasts to his companions and wishes for magnificent events to occur which will give him excitement and power. If these come his way, he will use them selfishly; but what actually come his way are usually hidings from his parents, accidental injuries which make him cry, and unpleasant dreams from which he wakes in a panic.

Bob is more successful than Angus in translating his desire to be tough into action but

underneath he is often timid and fearful. He is anxious to avoid the company of 'boys who might lead him into trouble'. He wants magnificent events but 'sometimes his nerves was bad and he felt like drowning himself'. 'He might set fire to shops and banks and theatres' but, occasionally, 'he wants to get into bed beside his mother so that he would not dream any more'.

*Defective delinquent Charlie* is one of a large family in the same district. He is reputed to be 14, but is a borderline defective. He is familiar with remand homes. He has committed numerous thefts, has destroyed much property and attends school only intermittently. He is now to be found in an institution which harbours mentally defective juvenile delinquents.

Charlie's hero wants to get a job as an engineer. He likes being with his mother best but is frequently in trouble with his parents on account of his stealing. His mother sides with him against father but they make up their quarrels after two or three rounds. He puts the blame for his misdemeanours on other boys but when he shows them anything it is nearly always something he has stolen. He wants to give up stealing and become reconciled with his parents but he feels that the prospects are dim. Charlie wants to 'buy his mother presents' even if he has to steal the money from her in order to do so. He wants 'to be with his mother', but in order to 'get his own back on father', on 'the police' and on 'the other boys', he wants to 'show off the gold watch which he has stolen from his father', 'plonk school', 'sleep in an air-raid shelter' and 'get his revenge on the other boys by killing them at night with a knife'. If he had it, he would like to spend his money on 'tooth-paste and soap and buy sweetie coupons' and then 'get married and come up and see mother'.

*The waif, David*, is of about the same age and intelligence as Angus and Bob. His mother and father are either unknown, have died or have separated. Through no fault of his own, he has lived for the past few years in a 'Home' with other boys. The boys help with the domestic duties; they have their own possessions, attend school in the town and go to football matches, the cinema, shops and church.

David's hero gets into trouble because he is disobedient. His parents threaten to send him away. They do so, however, because they quarrel with each other. In bed, he sometimes cries over his misdeeds and has rather unpleasant dreams from which he is awakened by external noises.

Beneath his rather colourless hero, a second person forms scarcely more than an etiolated shadow of the normal boy. He likes being with 'a little girl', gets into trouble for 'breaking windows', shows his friend 'his flowers in his garden', is frightened when 'he lost his pencil', tells other boys 'his mother was wanting to get married again', dreams 'he left his bed crooked and had a nightmare that he killed his sister'. He wishes 'to grow up but might have wanted his mother and father to stop with him', although he likes the bit where the boy said 'he was going to be good and in the morning he broke his word'.

Mr Hetherington and Miss White used the technique to compare their descriptions of the same twenty schizophrenic patients (6). Ten were men and ten were women and they were selected to represent a class of fifty-one cases of severe schizophrenia. There were clinical records for all of these patients and all finally recovered after leucotomy. From the clinical notes, Mr Hetherington and Miss White each prepared a personality description of each selected patient up to the time of the operation.

Noting those traits which were recorded twice as often in one set of descriptions as in



the other, it was found to be characteristic of Miss White that she tended to note the patient's appearance. In fact, of the total forty-six references to patients' appearances, forty-four were made by her. It was also characteristic of her that she recorded the patient's health and mental condition in childhood, his inability to pursue a regular occupation and his present mental state. It was characteristic of Mr Hetherington that he reported the history of the case, the patient's original occupation and the onset and subsequent course of the illness. There is a striking similarity between these findings and our earlier findings that girls tend to be interested in appearances, boys more in the things people do. Of the total 642 statements made, 26% were reported by Miss White alone, 21% by Mr Hetherington alone, the remainder by both. In other words, the two reporters agreed in approximately half their statements and in half reported different traits.

In the same way, noting those traits which were reported twice as often in one sex as in the other, they found that, when young, the male patients tended to do well at school; women patients failed to pursue a regular occupation. After the onset of the illness, it was characteristic of the women patients that they tended to be uncommunicative, while the men were more frequently reported as being restless and manneristic. Some of the men had broken down under war strain and were at an earlier stage in the illness when restlessness is a characteristic feature. No clearly defined sex differences between schizophrenics were in fact reported.

From the traits reported with equal frequency by Mr Hetherington and Miss White of both men and women patients, it was possible to build up a description of the typical, severe, schizophrenic personality.

In childhood, the typical schizophrenic appears to be normally healthy and intelligent but reserved, quiet and self-absorbed. After leaving school, he tries to pursue a normal career but his temperament begins to change and he is unable to continue his work satisfactorily. There is an insidious onset of mental illness with periods of marked abnormality. In mood and conduct, he becomes aloof and detached. He acquires odd habits and facial mannerisms. He giggles and mutters to himself. He becomes restless, impulsive, violent and difficult to manage. At times he will talk easily, even volubly, but there are times when he finds conversation difficult and becomes incoherent and taciturn. There are also times when he will not talk at all. He says he hears voices speaking to him and that people or things seem different. He believes he is being watched and persecuted and that someone is influencing him so that he cannot think clearly.

The technique employed makes it possible to bring together patients' individual statements about themselves. They show the progressive disorder of thought occurring in schizophrenia. As there are no sex differences in the data, we can talk of the group as if it were a single patient. He says he feels constantly tired but knows this is purely a mental feeling. He cannot think clearly. Everything is in a muddle. His thoughts stop so that he cannot concentrate. He suffers from headaches as if someone were hacking into his brain. He feels there is some interference in his head which prevents quick answers to questions. He thinks things influence his mind and that this is possible because his mind is weak. He seems led by some external power. He thinks someone is acting on him from a distance. People influence his ideas. Advertisements in the paper and talks on the wireless refer to him. He complains that the family affect his health. He believes that having his blood pressure taken has affected his head, also his legs and his heart. He

thinks his soul is a stone at the bottom of the sea. He says he has a tin heart. He seems in a dream state. Nothing seems real. His sense of values seems to have turned upside down. Patients at the hospital look like foreigners. His parents are not his natural ones. He has difficulties with his father who has become weird. His mother is a vampire trying to change him into an animal. His sister has been made younger by an operation. He accuses his brother of being Hitler. His wife is a German spy. Women look at him queerly. People laugh at him and make remarks about him. Neighbours hear everything he says and watch him. They shout at him from the houses. The law has something against him. He is being persecuted. There is a plot to keep him shut up in hospital. His food is being poisoned by people trying to do him harm. He is being tortured and is going to die. He feels electric shocks going through his body. He hears voices. It is all the family saying things. There is no cancer and there is no cure. They are the stars talking to him. He sees things coming at him. He saw a lot of devils. They shrieked and shrieked bells. You just feel as though you had been whipped afterwards.

Using the same technique, Dr Frankl compared relatives' letters describing these patients about a year after they had been discharged from hospital, having recovered after leucotomy (7). The discharged patient is described as 'physically healthy, a good eater and sleeper, with a marked feeling of well-being. His prevailing mood is cheerfulness. He does not worry, is happy and contented and shows it. He has a high opinion of himself and his abilities. He leads an active life, is restless, likes movement and change. His interests and hobbies are varied and variable, with a preference for light entertainment and superficial pastimes. He is easy-going, a good mixer, fond of social life and of being on good terms with everybody. His relations to other people around him often are without depth of feeling. He shows little sympathy or consideration for his next of kin or for anybody else. He neither regrets nor repents for whatever he may have done or said. He may be self-willed and headstrong and unable to see the other person's point of view. He tends to quickly-passing outbursts of temper.'

Dr Frankl compared the relatives' letters with the patients' letters about themselves. Forty-eight patients commented on their attitude towards their relatives, all contending that they got on well with them. Only twenty-nine relatives of these patients reported on this point. Ten stated that they found the patient difficult to live with.

It is interesting to compare descriptions of the patients before and after leucotomy. The technique indicates the striking difference after the operation to be that the patient no longer appears worried. Before the operation he was described as taciturn and as having ideas that he was watched, persecuted and in some way influenced so that he could not think clearly. Afterwards he is described as happy and contented, leading an active life, easy-going, a good mixer and fond of social life. The striking similarities are that both before and after the operation he is described as restless. He has outbursts of temper, is without depth of feeling and shows little sympathy or consideration for others. It would appear from the results that leucotomy removes the worry and abnormal organizations of thought and conduct but does not affect the underlying emotional and social deficiencies associated with schizophrenia.

## V. CONCLUSIONS

The several investigations which have been summarized demonstrate the technique of comparing personality descriptions and the kind of information obtained. There is every reason to think that the collection of more adequate and exhaustive records, and the



application of the technique to larger and more representative classes of people, can yield considerable information concerning the development of both normal and abnormal organizations of thought and conduct. It provides a means of comparing, qualitatively, and assessing, quantitatively, group similarities and individual differences of personality. It also presents the information obtained in a form which can be critically examined and correlated with ascertained organic conditions and with the results obtained by other psychometric methods.

The inquiry brings together the work of several collaborators. In addition to those whose names have already been mentioned, the writer would like to thank Miss J. Walshaw, Mrs M. Sisson and Miss V. Makiff for the 'Controlled Projection' responses of normal school-children, and Miss C. Barclay, Mr T. Moore and Mr G. Tweddle for their assistance in collecting 'Controlled Projection' responses of unusual boys.

Qualitative studies of the kind reported necessitate considerable secretarial work, and the writer would like to express his thanks and appreciation to Miss G. Laurie for her contribution to the successful progress of the inquiry.

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## CHARACTERISTIC PROJECTION TEST RESPONSES OF A GROUP OF DEFECTIVE DELINQUENTS

By G. A. FOULDS, *Runwell Hospital*

I. *Introduction* (p. 124). II. *Method of comparison* (p. 124). III. *Comparison between the typical defective delinquent and the normal boy of 9 to 10 years* (pp. 124–125). IV. *A-typical responses characterizing the defective delinquent boys* (pp. 125–126). V. *Conclusions* (p. 126). VI. *Appendix* (pp. 126–127). *References* (p. 127).

### I. INTRODUCTION

The investigation was designed to compare normal and abnormal systems of thought in childhood, as assessed by the Controlled Projection Test(1). Data had already been collected for boys and girls,  $6\frac{1}{2}$ – $12\frac{1}{2}$  years of age, selected to give a normal distribution for intelligence at each age. Such data, handled in the manner described by Raven(2), can be sorted into classes of responses to each question. From the frequency of occurrence of each class of responses tentative norms have been determined. A comparison has, therefore, been made between seventy-five normal boys, aged  $9\frac{1}{2} \pm 3$  years, and fifty-nine mentally defective delinquents with a mean mental age of approximately  $9\frac{1}{2} \pm 3$  years and chronological age of  $14\frac{1}{2} \pm 1\frac{1}{2}$  years.

### II. METHOD OF COMPARISON

(1) The response to each question is given a typicality mark equivalent to the normal frequency of the dominant idea expressed, not necessarily the first idea in the response.

(2) Subsidiary ideas expressed in the responses typical of normal responses are ignored, i.e. a response only receives one rating according to the observed frequency with which the central idea occurs amongst normal persons of the same age group.

(3) Part responses to a question, which do not occur amongst persons in the age group or remain unclassified, are underlined and considered separately.

(4) To determine the a-typical qualities of a projection record, all the part responses underlined and the total responses with a typicality rating of less than 10% are used to prepare a coherent synopsis of the degree to which the projection record deviates from the normal.

(5) From the results of this analysis a composite account of the deviations from the normal characteristic of a particular group of persons can be prepared for comparison with the composite deviations characteristic of any other group.

### III. COMPARISON BETWEEN THE TYPICAL DEFECTIVE DELINQUENT AND THE NORMAL BOY OF 9 TO 10 YEARS

This technique has been used to compare a group of normal boys (which, for convenience, will be known as 'Norman') and a group of defective delinquents ('Dan').

*Norman* is an ordinary boy between 9 and 10 years of age, living in a town where there are factories, a cattle market, an Army camp, an aerodrome, and all the usual things one finds in a town. From the country not far away a river runs through the town to the sea. Norman attends school there and knows most of the boys in the neighbourhood.

*Dan* lives in the slum area of a highly industrialized city. The family comprises mother



and father, Dan, now the eldest—the first-born having died—two brothers, two sisters, and another on its way. They all inhabit a two-roomed tenement flat. Dan is reputed to be about 14, but is a borderline defective. He is familiar with Remand Homes, Approved and Special Schools and is now to be found in an institution which harbours mentally defective juvenile delinquents. He has committed numerous thefts, has destroyed much property and attends school only intermittently. He acts tough and his acting carries conviction with a lay audience.

The Appendix provides in tabular form the statistical basis for the following descriptive comparison.

|                                                                                                                                                                                                                                                     |    |                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Norman's hero likes playing outdoor games with some of the other boys, though there are some with whom he would not play.                                                                                                                           | 1  | Although Dan's hero is very fond of outdoor games, particularly football, he is much concerned about getting a job, preferably in engineering. He wants to be with his parents, especially his mother, though there are times when he wants to avoid them. He is also most anxious to keep away from boys who steal. |
| His parents get cross with him and hit him because of his disobedience.                                                                                                                                                                             | 2  | His parents often get cross with him because of his own stealing and threaten to send him to a Home.                                                                                                                                                                                                                 |
| They also get cross with each other on his account; but they soon become reconciled.                                                                                                                                                                | 3  | They frequently quarrel over the boy and mother takes his side against father. They generally make it up after two or three rounds; meantime he is liable to get another hiding.                                                                                                                                     |
| He shows the other boys secret nests or birds and sometimes secret places to play.                                                                                                                                                                  | 4  | When he has a secret to show his friends, it is almost invariably stolen goods, the proceeds from which they spend on the cinema, sweets and ice-cream.                                                                                                                                                              |
| Occasionally he is frightened by someone or by some minor accident in which he is liable to get hurt.                                                                                                                                               | 5  | He is frequently scared by being almost run over.                                                                                                                                                                                                                                                                    |
| He nearly always tells boastful stories to his friends; but to his parents he tells imaginary ones as well and, equally often, gossip about other boys or lies designed to get him out of trouble.                                                  | 6  | He usually tells both his pals and his parents malicious gossip about other boys—in the latter case, with the intention of indirectly white-washing his own character.                                                                                                                                               |
| In bed he thinks about the nice things he will do on the following day; but sometimes he cries because he has been hurt.                                                                                                                            | 7  | In bed he indulges mainly in fancies; but he tends to cry on account of his fears and misdeeds.                                                                                                                                                                                                                      |
| He usually has nice dreams; but occasionally they are rather catastrophic. He is frequently wakened by external disturbances. In his nice dreams he wishes for playthings, which he is able to buy with the money he receives.                      | 8  | He usually has nice dreams, but sometimes they involve his worries over stealing and over his parents. These often become so fearful that they waken him up. In his pleasant dreams he wishes for playthings or magnificent happenings; but, with the money he is given, he buys presents for his parents.           |
| He wants to grow up and work.                                                                                                                                                                                                                       | 9  | He certainly wants to grow up, and work for his parents.                                                                                                                                                                                                                                                             |
| Norman likes his hero because things happen to him and because he is nice and kind. He sees no reason for disliking him, except that occasionally he tells lies. Sometimes he thinks he is like his hero; while at other times he thinks he is not. | 10 | Dan likes his hero because he is nice and kind; but, at the same time, he dislikes him because of his stealing. He is inclined to think nevertheless that his hero is better than he is himself.                                                                                                                     |

#### IV. A-TYPICAL RESPONSES CHARACTERIZING THE DEFECTIVE DELINQUENT BOYS

Type studies always encounter the difficulty that members of the group present some a-typical and even contradictory features which refuse to fit into any categories. In order to do full justice to the material and to the individual boys it has been found necessary to present also a composite picture made up from the responses which cannot be considered as characteristic.

Sometimes delinquent Dan's hero likes 'stealing' and, not unnaturally, dislikes 'being with the police'; but he likes 'being with his wee baby brother'.

His parents get cross with him because of 'his not liking his mother'. She 'left him, but came back after three years'. 'After his father hit him, he became bad and began to steal.'

When his 'mother went out with another man', his parents started fighting and his father 'was put to gaol'.

He shows his friend 'a gold watch which he stole from his father'.

'He was afraid of a murderer, rather like his uncle, who wanted to kill him.'

He tells the other boys 'his mother had just given him a hiding for running away from home for a week. He stole and he stayed away because his parents didn't like him because he wouldn't go messages and they threatened to send him to a Home.' He tells his parents 'he had finished stealing. Father started hitting him so he stole again and stayed out of the house for a fortnight. He slept in a shelter.'

In bed he thinks 'about plonking school. He was going to do it because he did it before and wasn't caught.' 'He also thought about getting revenge on the boys by killing them at night when they were separate, going to the pictures with a knife, but he changed his mind because one boy came up and said they were friends with him because he gave them all money.' Another time he cries because 'he thought his mother was dead, but she wasn't'.

'He dreamt a murderer killed his father'; but he woke up 'with a fright because he thought he saw mother getting stabbed in the back by father'. When he falls asleep again, he dreams that he wants 'to see Heaven' and 'father to go away' and that he has £1,000, which he spends on 'tooth-paste and soap and with the rest of the money he bought sweetie coupons'.

He wants to 'grow up and get his own back on father, to start fighting him and later get married and come up and see mother'.

Dan likes 'the bit about the angel which the boy has seen'; but he disapproves of the boy's habit of stealing. He is inclined to think that he was better than his hero—'he didn't steal from home'.

What comes to light from a comparison between typical and a-typical responses is the different ways in which opposite impulses are systematized, or remain unreconciled and operate as conflicting tendencies. Thus feeble-minded delinquent Dan wants to be with mother and to buy her presents, though he may steal the money from her in order to do so. He prefers the distaff side; but, in order to be revenged on father, on the police and on society in general, he has to adopt the tough masculine code of the local culture pattern.

## V. CONCLUSIONS

The results of the investigation suggest that a Controlled Projection test of this type, when handled by a method which permits of quantitative comparison without loss of the qualitative aspect, is of value, not only clinically in individual cases, but for the picture it gives of the interaction of selected and more or less homogeneous groups with their particular local culture patterns.

## VI. APPENDIX

The following show the percentage frequency of responses falling into each category for seventy-five normal (N) and fifty-nine mentally defective delinquent (D) boys:

|                                                |    |    |                                                       |    |    |
|------------------------------------------------|----|----|-------------------------------------------------------|----|----|
| 1 (a). <i>What did the boy like doing?</i>     | N  | D  | 2 (a). <i>His parents got cross with him because:</i> | N  | D  |
| a. Outdoor activities                          | 45 | 39 | a. He was disobedient                                 | 65 | 36 |
| b. Indoor activities                           | 31 | 24 | b. He was destructive                                 | 12 | 19 |
| c. Unspecified playing                         | 16 | 2  | c. He was disagreeable                                | 9  | 17 |
| d. Useful occupations                          | 5  | 25 | d. He was getting dirty                               | 8  | 0  |
| e. Unclassified                                | 3  | 10 | e. He was wanting things                              | 4  | 0  |
| 1 (b). <i>Whom did he like being with?</i>     |    |    | f. Unclassified                                       | 1  | 29 |
| a. Friends                                     | 78 | 37 |                                                       |    |    |
| b. Relations                                   | 9  | 56 |                                                       |    |    |
| c. Things, animals                             | 8  | 0  | 2 (b). <i>The result was:</i>                         |    |    |
| d. Opposite sex                                | 5  | 3  | a. He was hit                                         | 35 | 32 |
| e. Unclassified                                | 0  | 3  | b. He was banished                                    | 19 | 34 |
| 1 (c). <i>Whom did he not like being with?</i> |    |    | c. He was punished (with atone-ment)                  | 15 | 10 |
| a. Same sex                                    | 73 | 39 | d. He changed                                         | 8  | 10 |
| b. Opposite sex                                | 12 | 8  | e. He got hurt                                        | 7  | 0  |
| c. Things, animals                             | 5  | 2  | f. He got his way                                     | 3  | 5  |
| d. Relations                                   | 4  | 24 | g. Unclassified                                       | 14 | 8  |
| e. Unclassified                                | 5  | 27 |                                                       |    |    |



|                                                             |  |    |    |                                                          |  |    |    |
|-------------------------------------------------------------|--|----|----|----------------------------------------------------------|--|----|----|
| 3(a). <i>The parents got cross with each other because:</i> |  | N  | D  | 8(a). <i>He dreamt:</i>                                  |  | N  | D  |
| a. Of the child                                             |  | 51 | 63 | a. Nice dreams                                           |  | 55 | 53 |
| b. Of father                                                |  | 19 | 19 | b. About catastrophes                                    |  | 29 | 10 |
| c. They couldn't agree                                      |  | 12 | 10 | c. About his worries                                     |  | 13 | 32 |
| d. Of mother                                                |  | 8  | 5  | d. Unclassified                                          |  | 3  | 5  |
| e. Unclassified                                             |  | 11 | 3  | 8(b). <i>He was awakened by:</i>                         |  |    |    |
| 3(b). <i>The result was:</i>                                |  |    |    | a. Disturbances                                          |  | 48 | 27 |
| a. A reconciliation                                         |  | 47 | 59 | b. His dreams                                            |  | 16 | 25 |
| b. Unresolved                                               |  | 19 | 15 | c. His fears                                             |  | 13 | 36 |
| c. A division of the family                                 |  | 16 | 14 | d. His fancies                                           |  | 13 | 5  |
| d. A punishment                                             |  | 8  | 10 | e. His pains                                             |  | 4  | 3  |
| e. Unclassified                                             |  | 11 | 2  | f. Unclassified                                          |  | 5  | 3  |
| 4. <i>He showed the other boys:</i>                         |  |    |    | 8(c). <i>He wished for:</i>                              |  |    |    |
| a. Nests or birds                                           |  | 39 | 2  | a. Playthings                                            |  | 51 | 36 |
| b. Places                                                   |  | 27 | 7  | b. Magnificent events                                    |  | 21 | 25 |
| c. Playthings                                               |  | 15 | 10 | c. Reconciliation                                        |  | 15 | 15 |
| d. 'Real' things                                            |  | 11 | 75 | d. Living things                                         |  | 12 | 10 |
| e. Animals or babies                                        |  | 8  | 5  | e. Unclassified                                          |  | 1  | 14 |
| f. Unclassified                                             |  | 1  | 2  | 8(d). <i>With his £1000 he:</i>                          |  |    |    |
| 5. <i>One day he had a fright. What happened?</i>           |  |    |    | a. Bought things                                         |  | 60 | 20 |
| a. He was just scared                                       |  | 59 | 63 | b. Gave presents                                         |  | 17 | 54 |
| b. He got hurt                                              |  | 20 | 8  | c. Saved up                                              |  | 16 | 19 |
| c. He was afraid of being caught                            |  | 8  | 17 | d. Had adventures                                        |  | 4  | 2  |
| d. He was afraid of being forsaken                          |  | 5  | 3  | e. Unclassified                                          |  | 3  | 5  |
| e. He had tender feelings                                   |  | 5  | 5  | 9. <i>He wanted to:</i>                                  |  |    |    |
| f. Unclassified                                             |  | 3  | 10 | a. Grow up and work                                      |  | 67 | 85 |
| 6(a,b). <i>He told his friends:</i>                         |  |    |    | b. Grow up and do as he liked                            |  | 16 | 8  |
| a. Boastful stories                                         |  | 44 | 19 | c. Grow up (unqualified)                                 |  | 1  | 2  |
| b. Imaginary stories                                        |  | 23 | 27 | d. Stay young and play                                   |  | 11 | 2  |
| c. Gossip                                                   |  | 13 | 37 | e. Stay young and be looked after                        |  | 1  | 2  |
| d. Expedient lies                                           |  | 8  | 7  | f. Stay young (unqualified)                              |  | 4  | 2  |
| e. Unclassified                                             |  | 12 | 10 | 10(a). <i>He liked the boy in the story because:</i>     |  |    |    |
| 6(c,d). <i>He told his parents:</i>                         |  |    |    | a. Nice things happened                                  |  | 40 | 34 |
| a. Imaginary stories                                        |  | 25 | 17 | b. He was nice and kind                                  |  | 37 | 53 |
| b. Expedient lies                                           |  | 24 | 5  | c. Of everything                                         |  | 11 | 5  |
| c. Boastful stories                                         |  | 23 | 17 | d. He wanted to grow up                                  |  | 5  | 0  |
| d. Gossip                                                   |  | 20 | 47 | e. Unclassified                                          |  | 7  | 8  |
| e. Unclassified                                             |  | 8  | 14 | 10(b). <i>He disliked the boy in the story because:</i>  |  |    |    |
| 7(a). <i>In bed he thought about:</i>                       |  |    |    | a. Of nothing                                            |  | 43 | 24 |
| a. His fancies                                              |  | 31 | 41 | b. He told lies                                          |  | 21 | 7  |
| b. To-morrow                                                |  | 23 | 14 | c. He was naughty                                        |  | 15 | 44 |
| c. His difficulties                                         |  | 21 | 29 | d. He hurt other people                                  |  | 5  | 5  |
| d. His lies                                                 |  | 15 | 5  | e. He was frightened                                     |  | 5  | 7  |
| e. Past events                                              |  | 7  | 8  | f. He was selfish                                        |  | 4  | 3  |
| f. Unclassified                                             |  | 4  | 3  | g. Unclassified                                          |  | 7  | 10 |
| 7(b). <i>He cried because of:</i>                           |  |    |    | 10(c). <i>The subject and the boy in the story were:</i> |  |    |    |
| a. His injuries                                             |  | 48 | 27 | a. Unlike in what they did                               |  | 35 | 46 |
| b. His fears                                                |  | 15 | 24 | b. Unlike in appearance                                  |  | 8  | 15 |
| c. His misdeeds                                             |  | 13 | 22 | c. Unlike (unqualified)                                  |  | 3  | 7  |
| d. His dreams                                               |  | 8  | 7  | d. Alike in what they did                                |  | 32 | 27 |
| e. Feeling lonely                                           |  | 7  | 14 | e. Alike in appearance                                   |  | 9  | 2  |
| f. Injuries to others                                       |  | 7  | 2  | f. Alike (unqualified)                                   |  | 0  | 0  |
| g. Unclassified                                             |  | 3  | 5  | g. Unclassified                                          |  | 13 | 3  |

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## GENETICAL INFLUENCES ON THE INTELLIGENCE LEVEL OF THE POPULATION<sup>1</sup>

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*I. Psychological reasons for a different viewpoint (pp. 128–129). II. Genetical reasons for a new viewpoint (pp. 129–131). III. The supposed decline of intelligence level (pp. 131–133). IV. Demonstration of a model population in equilibrium (pp. 133–135). V. Conclusion (p. 135). References (pp. 135–136).*

We have been repeatedly told by authoritative psychologists (Burt, 1946; Thomson, 1947) that the average level of the British population is declining. In the United States, the same type of degeneration is alleged by prominent eugenists to be taking place. Along with these processes, the incidence of mental deficiency is thought to be increasing.

I would like to draw attention to two main reasons for taking a different view of the situation. The first is chiefly psychological and concerns the nature of the concepts of intelligence and of its absence, mental deficiency. The second reason is strictly genetical.

### I. PSYCHOLOGICAL REASONS FOR A DIFFERENT VIEWPOINT

Taking the first question, let us examine the concept of intelligence. In recent years this has become increasingly identified with scholastic aptitude. Our industrial and clerical civilization leads us to value highly those people who can be taught to perform complicated arithmetical and linguistic operations with accuracy. In primitive conditions, quite different qualifications would be valued, such as ability to catch fish and to avoid being lost in a forest. The intelligence tests which are generally considered most reliable, like the Binet, favour children with scholastic or clerical ability (Burt, 1922). To take a simple concrete example: when American Indian children are compared with European children who have had similar schooling, the Europeans are found to do better on the Binet test but the Indians have the advantage on the Porteus Maze test (Sparling, 1941).

Our measurements of intelligence are thus relative and not absolute, and they depend upon variable standards. The theories at present in vogue concerning the nature of intelligence, derived originally from Spearman, involve an abstraction, 'general intelligence', which is equivalent to the idea of 'size' of a physical object. It is a philosophical abstraction which cannot be directly measured, and is, therefore, a very unsuitable character to use for genetical studies, where specific and objective measurements are needed. It is logical to study the genetics of ability on a given test, as Tyron (1929) did with his rats. But it is not logical to express the results in terms of the fictitious entity 'intelligence'. Neither does it help if this entity is defined as 'innate' because 'innateness' does not imply heritability.

Turning to the problem of absence of intelligence or mental defect, it is generally admitted (and was fully accepted by the Wood Committee in 1929) that the essential criterion should be social incompetence. Now, in an urban community, social competence depends greatly upon possession of aptitudes for subjects taught at school; this is much less significant in a rural community, where wage-earning capacity and general usefulness depend upon quite different qualities.

<sup>1</sup> A paper read at the British Association Meeting, Newcastle, 1949.



To illustrate how closely the diagnosis of mental defect is related to failure at school, I quote from the Wood Report. The incidence of ascertained cases of mental defect, in the population at all ages, was given as 8.6 per thousand, but when the age groups are taken into account, a most peculiar phenomenon appears (Penrose, 1949). The notified cases of this supposed disease of mental deficiency are lowest between 0 and 4 years, highest in the quinquennium 10 to 14 years and lower again in the subsequent age groups. Viewed by an epidemiologist, who did not know anything about the pathology of the condition notified, the distribution would give the strong impression of a disease with onset usually after the age of 5 years and with greatest risk in the 10 to 14 year range, adults being again less susceptible. It would also seem to be a chronic disease and one which probably carried a mortality rate higher than that of the general population. What happens in this period from 5 to 15 years, which is so dangerous in this respect? The answer, of course, is that the children are exposed to the practice of education. It would be not unreasonable to assert that the educational system was a cause, perhaps the chief cause, of mental deficiency. It would be hard to find a clearer demonstration of the arbitrary nature of the current definitions of mental defect and the obviousness of social environment as a factor in determining incidence.

It has been urged as an argument for pessimism that the Royal Commission of 1904 only found half as many defectives in the population as did the Wood Committee 25 years later. In view of the different methods of ascertainment and definition in the two surveys and the lack of attention paid to age grouping in the first survey, the comparison is, I believe, valueless for scientific purposes. To infer that the basic abilities in England and Wales had decreased during the intervening 25 years, from these sets of figures, would be as absurd as to suppose that the Danes, who have nearly six times as many certified defectives per thousand population as the French, are, on that account, inferior in basic intellectual level.

## II. GENETICAL REASONS FOR A NEW VIEWPOINT

I will now turn to the more strictly genetical aspect of the subject. I have pointed out that intelligence itself is an unsatisfactory character of which to study the genetics, because it is not capable of exact measurement. However, I want to proceed with the argument rather than quarrel with definitions, and will therefore concede that it is approximately correct to interpret intelligence test results as measuring something which can be genetically studied without necessarily making gross errors. Genetical investigations in this field have, on the whole, followed the traditional pattern laid down for the study of metrical characters, such as stature. The results obtained with intelligence tests on parents and children and on brothers and sisters (sib pairs) show certain general features not dissimilar to those obtained with stature. On the whole, perhaps, the likenesses between related pairs of these types are a little weaker with respect to intelligence than with respect to physical measurements. The crude averages of a number of correlation coefficients shown in Table 1 for intelligence in parents and children and in sib pairs are, nevertheless, 0.49. This figure is very close to Pearson's ideal correlation of 0.5. A correlation of one half, which has been obtained repeatedly for physical measurements in sibs, is usually interpreted as meaning that the quality studied is entirely due to additive hereditary factors. An additive gene has a quantitative effect independently of other genes: two additive genes of the same kind produce double the effect of one. Another way of

expressing the same thing is to say that the mean intelligence level of children in any given set of families is the same as the average level of the parents.

There are numerous pitfalls in the arguments based on correlation. Some important fallacies have been pointed out by Hogben (1933). Similarities of environment within families tend to produce likenesses between pairs of relatives and thus to increase the correlations. Moreover, the fact that any particular environmental effect does not show itself in a given sample of the population or only produces small changes, does not imply that such environment is unimportant. In a population, tolerably well nourished and healthy, one does not expect to find gross deficiencies in intellect due to malnutrition. On the other hand, in populations where hook-worm infestation occurs, it has been found that a marked reduction of intellectual capacity (Smillie & Spencer, 1926), which presumably readjusts to the normal on cure, occurs in association with this infestation in children. Ill health, however, as shown by Dawson (1931), does not usually reduce performance

Table 1. *Correlation coefficients for intelligence*

| Source <sup>1</sup> | Parent-child<br>pairs | Sib-sib<br>pairs | Parent-parent<br>pairs |
|---------------------|-----------------------|------------------|------------------------|
| Burt (1911)         | 0.34                  | 0.48             | —                      |
| Thorndike (1928)    | —                     | 0.60             | —                      |
| Willoughby (1928)   | 0.35                  | 0.42             | 0.44                   |
| Jones (1928)        | 0.53                  | 0.49             | 0.60                   |
| Herrmann (1933)     | —                     | 0.32             | —                      |
| Matthews (1937)     | —                     | 0.30             | —                      |
| Penrose (1938)      | —                     | —                | 0.39                   |
| Cattell (1938)      | 0.84                  | 0.77             | 0.81                   |
| Roberts (1940)      | —                     | 0.54             | —                      |
| Halperin (1946)     | 0.37                  | —                | 0.65                   |
| Average: observed   | 0.49                  | 0.49             | 0.56                   |
| expected            | 0.78                  | 0.78             |                        |

<sup>1</sup> For full references see Penrose (1949).

on tests except in cases where there is disease of the nervous system. If certain effects of environment are not sufficiently strong to be demonstrable in a genetical study of families in a given population, this does not mean that environment is unimportant, it may only show that it is fairly constant for the population. Exactly the same considerations tend to invalidate too rigid inferences about the relative effects of nature and nurture based upon twin studies.

In estimating the expected likeness for relatives with respect to metrical characters, one significant factor is often neglected, namely, the tendency of like to marry like or assortative mating. The inter-parental likeness measured in terms of correlation by Pope & Pearson (1908) for numerous physical and mental traits varied between +0.2 and +0.25. For stature, Davenport's (1917) extensive material corresponds with an inter-parental coefficient of +0.33. With regard to intelligence level, considerably higher values are consistently obtained. The average of five estimates of the inter-parental correlation for intelligence is +0.56 (see Table 1). So strong a tendency as this for parents to resemble one another alters the expected values of the sib-sib and parent-child correlations for an additive genetical character. The expected correlation for intelligence in parent-child and in sib-sib pairs in systems without differential fertility should be increased by half the inter-parental value. This makes the expected values in Table 1 0.50+0.28 or 0.78 and it would seem that the observed values fall considerably short of this. The observed values



close to 0.5 are, in fact, nowhere near what would be expected on the multiple additive factor hypothesis. There is plenty of room for the assumption of other sources of variation.

Dominance and recessivity of the genetical factors will explain the discrepancy to some extent because they reduce correlation values. It is known that there are numerous rare recessive genes causing defects of intelligence, but it is generally believed that most of the common genes responsible for normal variations are additive. If so, the magnitudes of the correlations obtained are not as conclusive evidence of the strength of genetical forces in determining intelligence level as has often been supposed.

### III. THE SUPPOSED DECLINE OF INTELLIGENCE LEVEL

After this brief review of the difficulties and sources of error in studying the genetics of intelligence, I would now like to discuss the question of the threat of decline in the intelligence level of the population. First of all, there is no direct evidence of this unless people are willing to accept as evidence ascertainment of defectives, which I, personally, am not willing to do. The evidence is all indirect and is based upon the combination of two types of observations. These are: (i) the supposed fact that intelligence is inherited to a large extent as a character determined by multiple additive genes; (ii) the undoubted fact that children from large sibships do less well on intelligence tests than children from small families and the assumed inheritance of fertility. Thus it is argued that children of low intelligence transmit this quality together with the increased fertility associated with it to succeeding generations. The inference that the general level of intelligence must decline seems inescapable. Yet, for a variety of reasons, I believe that this conclusion is unjustified. There are, indeed, the results of two other types of observations, which also must be taken into account to complete the picture. These are: (iii) the infertility of defectives below a certain minimal level of intelligence; (iv) assortative mating.

A crude way of looking at the problem, and a rather common one, is to speak of part of the population as constituting a 'social problem group'. This group is supposed to comprise about one-tenth of the whole population. Its members are alleged to be much less intelligent than the remainder and to be exceptionally fertile. Many of their children are defective and many die in infancy. There is also a strong tendency for endogamy within the group. Civilization is therefore supposed to be 'silently rotting at the core' because ultimately the 'submerged tenth' of the population will increase and swamp the remainder, whose fertility is insufficient for their continuing replacement.

Before going further into the problem of intelligence level it may be worth while to examine some parallel cases. The obvious parallel is a metrical character such as stature. Here is a quality which has been supposed by Galton and Pearson to be almost completely controlled by heredity. If so, the type of inheritance, as with intelligence, must be multi-genic and additive. Moreover, a negative correlation between stature and family size among school-children has been demonstrated, for example, in the extensive tables of Boas (1910) for Toronto. Again, the conclusion seems inescapable that average stature of children is on the decline because the short people are breeding faster than the tall ones. Actual measurements of school-children indicate that the opposite is true and that the mean stature of succeeding generations in Toronto and elsewhere is increasing. I am willing to believe that this improvement is due to better nourishment, and I am inclined to think that the genetical structure underlying stature is unchanged. I do not believe

that the children are innately shorter than before and that the increase in height is a misleading façade.

Another example of a metrical character is length of life. Beeton & Pearson (1901) showed that this also is a character largely controlled by heredity. Now, there is some evidence that longevity is correlated with hygienic conditions, high standard of living, lack of exposure to industrial risks and also, inevitably, with the small families, which go with the preceding advantages. Mean length of life in the population should, by the arguments used for intelligence, become less and less in each succeeding generation. As everyone knows, the opposite is the case. On the basis of these two analogous examples, I would not be at all surprised to find that intelligence level in the community was gradually improving. Even if only one-third of the variations of intelligence level were due to environment, it would be very easy to produce a marked average increase by favourable alterations in methods of education and hygiene.

It is sometimes asserted that, although favourable environment may be increasing the average stature, health and I.Q. of the nation's children, this is really an illusion in the sense that the genetical structure is deteriorating. The argument is that the unfit are propagating at the expense of the rest of the community. In biology, however, the notion of fitness is inseparable from fertility. The most effectively fertile are *ipso facto* the most fit; so that a population only becomes less fit if its total numbers or total potential fertility declines. If intelligence is associated with loss of fertility, by the inexorable logic of natural selection, the intelligent are relatively unfit and there is no further argument about it.

I would like to draw attention to what may be a fundamental divergence between my own approach to these matters and the current outlook. Differential fertility in the population is commonly assumed to be due to social environment. My own view is that it has a biological origin and is a natural and permanent phenomenon. Galton (1866) observed that men of genius tended to be infertile: so also were medieval scholars. Actual fertility, in terms of number of children born, is determined both by psychological and physical traits, and it is not at all unreasonable to suppose that high intelligence is biologically correlated with low fertility.

Both theoretical and practical evidence goes to show that the genetical structures of most populations change very slowly. In human populations, no changes in frequencies of known genetical characters, like the blood antigens, have been detected during the period in which these have been under observation. Their distributions, calculated on the assumption of equilibrium, agree well with observations. The conditions necessary for equilibrium of genes, which alter fertility, have also been studied, and it is again surprising how slow is the action of natural selection in most instances. Moreover, when selection is balanced by new mutation, states of stable equilibrium are reached. New mutations, however, are rare events and can only produce equilibrium for rare genetical characters.

Another type of stable equilibrium of genetical structure occurs as a consequence of 'heterosis'. This is a likely cause of genetical stability with common characters. The phenomenon is of frequent occurrence in both wild and experimental populations, and was originally known as 'hybrid vigour'. Essentially, it means that the heterozygote or hybrid is fitter than either of the two corresponding homozygotes. Thus, in breeding pure, i.e. homozygous, lines of plants or of animals it has been found that physical vigour and fertility are likely to be diminished. Vigour is restored by out-crossing. For instance, Boas (1948) quotes remarkable figures showing that females of mixed Indian and European ancestry



are more fertile than the relatively pure ancestral stocks. In the case of maize, the standard method of obtaining maximal yield is to cross two pure lines. Individually the pure lines are inferior to the desired resulting hybrid, which is heterozygous for a large number of characters and very fertile. In a single polymorphic population, heterosis is equivalent to loss of fertility at the extremes on either side of the mean of a metrical character.

We now come to the main point. Is it not possible that differential fertility in human stocks, with respect to intelligence and perhaps also with respect to other characters, is a perfectly natural and normal phenomenon and, in fact, an example of heterosis? If so, the population can easily be in stable equilibrium as regards the genes for intelligence. Assortative mating tends to make equilibrium less stable, but it seems that, in human populations, this tendency is amply compensated by the very large differential fertility which exists. For example, in the lower tenth of the population from the point of view of i.q., family size is double that in the rest of the fertile population (Burt, 1946). Below a certain level, e.g. i.q. 50, however, fertility is reduced again, though this fact does not show itself in the estimates based on sibs of school-children because infertile types with low intelligence can come from large sibships.

#### IV. DEMONSTRATION OF A MODEL POPULATION IN EQUILIBRIUM

Some time ago I demonstrated a model of an imaginary population (Penrose, 1948) with all the main properties alleged to apply to the normal and social problem groups, which I quote here, with slight alterations, in Table 2. This is merely a rather extreme example

Table 2. *Model population in stable genic equilibrium with assortative mating and differential fertility*

| Type of parental mating | Relative frequency | Offspring per mating | Types of offspring             |                                              |                                                |
|-------------------------|--------------------|----------------------|--------------------------------|----------------------------------------------|------------------------------------------------|
|                         |                    |                      | Normal <b>AA</b><br>(i.q. 108) | Defective and fertile <b>Aa</b><br>(i.q. 66) | Defective and infertile <b>aa</b><br>(i.q. 24) |
| <b>AA</b> × <b>AA</b>   | 9                  | 1.89                 | 17                             | —                                            | —                                              |
| <b>Aa</b> × <b>Aa</b>   | 1                  | 4.00                 | 1                              | 2                                            | 1                                              |
| <b>aa</b> × <b>aa</b>   | 0                  | 0.00                 | —                              | —                                            | —                                              |
| Total offspring         |                    |                      | 18                             | 2                                            | 1                                              |

of the kind of stable equilibrium automatically produced when the hybrid is more fertile than the pure types. It is intended to approximate as far as possible to real conditions and the type of inheritance of intelligence is assumed to be strictly additive. Systems of equilibrium of this kind may be quite common in natural populations of animals as well as in man. I have chosen, for simplicity of demonstration, the extreme case in which assortative mating is complete. All such models, of course, are based on the assumption of constant environment.

Imagine a race composed of three main types determined by a single intelligence gene. The pure or homozygous type **AA** is supposed to be normal (i); we will say it has an i.q. slightly above 100 and people of this type make up about nine-tenths of the population. Their net fertility is too low to keep up their numbers and I suppose them to have an average of less than two children per family. There is, next, a social problem group (ii) making up about one-tenth of the population, all the members of which are hybrid, i.e. heterozygous for a gene **a**. This gene reduces scholastic ability and type **Aa** has

greatly increased fertility—about double the average and implying four children per family. The individuals homozygous for **a** will be mental and physical weaklings (iii), incapable of reproduction. Owing to the additive nature of the gene, their mental grades must be too low to be compatible with mating or even survival in most cases. That is, one gene **a** reduces I.Q. by, say, 30 to 40 points, and two such genes reduce it by 60 to 80 points. Now we assume perfectly assortative mating, so that no unions take place between class (i) and class (ii), and we set the system in motion. We find that it has genetical equilibrium. This is due to the fact that the defectives' matings not only maintain their own numbers among their offspring but also contribute to the superior group; the proportion of weaklings produced implies an additional loss through infant mortality. The I.Q. levels of the groups can be chosen so that the mean for the whole population is 100.

In Table 2, the proportions of the groups are such that there is exact replacement in each generation. The population is, therefore, in equilibrium. Furthermore, the equilibrium is stable. If we should suppose that the size of the superior group was suddenly reduced, the mean population I.Q. would fall below 100. However, in each succeeding generation, it would rise appreciably until it finally settled again at 100 after the complete rebuilding of the superior group. This would also occur, even if all of group (i) were eliminated at one moment. Conversely, if there were initially too many in group (i), their numbers would gradually diminish until the same stable proportions were reached. In the region of equilibrium, the rate of change per generation would be extremely slow. It is interesting to note that the defectives are the genetical backbone of this population. If an efficient sterilization programme were instituted against this submerged fertile tenth, it would diminish the total fertility of the whole group and jeopardize the future of the race.

There are many interesting properties of this particular population structure. A population of this kind, not in equilibrium because there were too few in group (i), would raise its mean I.Q. in each successive generation until the original stable state (I.Q. 100) was reached. During this period of adjustment, the birth-rate would fall, although the total numbers in the population would slowly increase, provided that the numbers are supposed to be stationary at the equilibrium point. Such conditions (see Table 3, second

Table 3. *Effects of disturbance of equilibrium in the model population*

| Initial lack of balance     | Too many defectives, <b>Aa</b> | Too many normals, <b>AA</b> |
|-----------------------------|--------------------------------|-----------------------------|
| Intelligence level trend    | Increase                       | Decline                     |
| Birth-rate of population    | Declining                      | Increasing                  |
| Numbers in total population | Increasing                     | Declining                   |

column) have been observed in our own actual population in recent times. Then, again, changes in the degree of assortment in matings would alter the equilibrium point. More random mating would tend to reduce the population I.Q. level and more assortment would tend to raise it.

Model systems can be constructed so as to allow any desired degree of assortative mating. In Table 4 the parent-parent correlation is 0.56. As before, the mean I.Q. is at 100. The standard deviation of I.Q. is 14.9 points and the correlation coefficients at equilibrium point agree in many respects with observation. There is stable equilibrium in spite of the fact that the correlation of I.Q. and sib number is  $-0.35$  because of the lack of



correspondence between sib number and individual fertility. This peculiarity is a general feature of populations in which heterosis produces equilibrium, as mentioned by Haldane (1949).

Table 4. *Model population with parent-parent correlation coefficient +0.56*

| Condition of population at equilibrium point |       |                         |           |
|----------------------------------------------|-------|-------------------------|-----------|
| Genotype                                     | I.Q.  | Frequency               | Fertility |
| AA                                           | 105.2 | 0.900                   | 0.9584    |
| Aa                                           | 69.2  | 0.100                   | 1.6166    |
| aa                                           | 33.2  | 0.024                   | 0.0000    |
| Mean I.Q. 100.0                              |       | Standard deviation 14.9 |           |

  

| Parents     |                 | Fertility <sup>1</sup> | Offspring |      |     |
|-------------|-----------------|------------------------|-----------|------|-----|
| Mating type | Number of pairs |                        | AA        | Aa   | aa  |
| AA·AA       | 86              | 1.917                  | 164.9     | —    | —   |
| AA·Aa       | 8               | 2.575                  | 10.3      | 10.3 | —   |
| Aa·Aa       | 6               | 3.233                  | 4.8       | 9.7  | 4.8 |
| All         | 100             | 2.048                  | 180.0     | 20.0 | 4.8 |

Correlation coefficients at equilibrium point

| Parent I.Q. and child                                               | Sib-sib I.Q. | Parent-parent I.Q. |
|---------------------------------------------------------------------|--------------|--------------------|
| 0.61                                                                | 0.58         | 0.56               |
| I.Q. and size of sibship, -0.35. I.Q. at birth and fertility, 0.00. |              |                    |

<sup>1</sup> Sum of parental fertilities.

## V. CONCLUSION

My conclusion from all these considerations is, then, that probably the level of intellectual ability in the population, though subject to fluctuations due to environmental changes, is based upon a stable genetical system. I see no reason for supposing that mental deficiency is becoming commoner, except in so far as our criteria of social competence may be getting more stringent. Finally, I think it is reasonable to regard the part of the population which is most fertile but least well adapted to scholastic training as a necessary and quite normal part of the structure, giving genetical stability to the whole group.

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# APPARENT RELATIONS BETWEEN PSYCHOLOGICAL AND PHYSICAL CONSTANTS

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I. *The problem* (pp. 137-140). II. *The need for two psychological constants* (pp. 140-141). III. *Possible relations with physical constants* (pp. 141-144). IV. *General discussion and further problems* (pp. 144-147). V. *Summary* (pp. 147-148). VI. *Table of constants* (p. 148). *References* (p. 148).

## I. THE PROBLEM

I have elsewhere suggested two values, namely  $T_0$  and  $p$ , deriving from the curve of mental output (curve of fluctuation of attention), values so constant that they seem to be true for all people under all conditions of experiment. The present question is whether they bear any relation to the constants of physics.

The matter is speculative because we have, as yet, no theory as to why such relations should occur. It is obvious that if enough relations were forthcoming we might perhaps arrive at a theory, but we shall not reach that point in the present paper.

Our task is to present the facts as they seem to be at the moment. To do that, it will be necessary to give enough information to act as a background. We must illustrate the two constants in question, noting further the meaning of log time, for  $p$  is a unit of log time on a scale running from  $T_0$  as zero. Because log time comes in we shall refer to the work of Milne who uses it in physics. At greater length we shall refer to Eddington and his attempt to relate measures of the universe to those of the atom. We do this partly because of the analogy with our own attempt to relate mental and physical measures, and partly because through his formulae we could, if necessary, relate our measures to those of the universe as well as the atom.

The constant  $p$  was derived from a study of inter-trough distances in curves plotted against the log of time. Consider, therefore, the following sequence:

$$63\frac{1}{2} \quad 123 \quad 239 \quad 464 \quad 900 \quad \dots \quad \text{sec.} \quad (1)$$

The times are those at which quite commonly occurring troughs appear. As will be obvious, they form a geometric progression with common ratio 1.94. That is to say, each is 1.94 times the one before it. The logs of numbers in G.P. are themselves in A.P. with common increment equal to the log of the geometric ratio concerned, here  $\log 1.94 = 0.2880$ . In other words, if we wrote down the logs of the numbers in series (1) we should find that they differed from one another by steps of 0.2880.

After measuring many such log increments it became apparent that they tend to be multiples of  $p = 0.0016$ . Thus, for example,  $0.2880 = 180 \times 0.0016 = 180p$ . There is here illustrated the chief practical use of  $p$ . It is a very useful unit of log time.

For theoretical purposes it is better to use logs to base  $e$ . Formally therefore, let us set down

$$p = 0.00160 \text{ (to base 10),} \quad (2a)$$

$$p = 0.00368 \text{ (to base } e\text{).} \quad (2b)$$

There are many trough sequences of the kind illustrated above. They are such that

(were they produced) they would all meet in and share a common trough at the time

$$T_0 = 4.076 \times 10^{-23} \text{ sec.} \quad (3)$$

Just why this should be so one cannot say. In fact, I have not yet been able to frame any kind of a theory explaining just why  $p$  and  $T_0$  should exist or why they should have those values. One must take them as facts without being able to say why. It is possible that inquiries of the kind illustrated in this article may ultimately throw light on the why and the wherefore. But that is another matter.

Having briefly introduced  $T_0$  and  $p$  we may turn to more general problems. We are going to try to relate the two mental constants to those of physics. Consider therefore the following extracts from Eddington<sup>(1)</sup>, written after he had made the attempt to relate measures of the universe with those of the atom. With justifiable hyperbole he began:

To measure the mass of the electron a suitable procedure is to make astronomical observations of the distance and velocities of spiral nebulae!

Having briefly recapitulated part of the argument he went on:

Perhaps you will object that this is not really *measuring* the mass of an electron; even supposing it to be right it is a highly circuitous inference. But do you suppose a physicist actually puts an electron in the scales and weighs it? If you will read an account of how the spectroscopic value of the mass has been determined you will not think my method unduly complicated. But of course, I do not seriously put it forward in rivalry; I only want to make vivid the wide interrelatedness of things. (1, p. 118.)

There are several things to emphasize here. Take, for example, the statement that the mass of an electron is not measured directly. It is a well-known and obvious fact. I would therefore stress that the same applies to my own two constants. Each was derived after a long and circuitous argument. The constant  $p$  was the larger of the two, but even it was not *measured* directly. It was inferred.

Or again, take the last two sentences of the extract. Having shown that the mass of an electron can be derived from measures of the universe at large, Eddington added that he did so merely to prove that all things are related. So, too, in this present article, I shall employ some of the figures used by Eddington. But I shall not therefore feel justified in predicting the size of the universe from constants arising out of a study of the curves I obtained by experimenting on school-children in the East End of London. Conversely, I shall not indulge in the equally fascinating task of deriving *their* curves from a study of the spiral nebulae. It may look as though it could be done, but even so the essential point would merely be to prove the interrelatedness of things; to show that sooner or later we may have a theory of mental work complete enough to prove that the universe, atom and mind are but aspects of one and the same thing.

Coming back to the problem of log time we may note that it is not as strange a notion as it was a generation ago. E. A. Milne<sup>(3)</sup> quite boldly claims that it should be used for certain purposes in physics. He has, moreover, postulated a value

$$t_0 = 6.3 \times 10^{16} \text{ sec.} \quad (4)$$

that functions in his system much as  $T_0$  does in mine.

Milne suggests that the use of log time will clarify certain problems in astro-physics. The more distant nebulae seem to be moving away from us at terrific speeds. The further away they are the faster they seem to move. As is well known, the calculations depend on the amount of 'red shift' in light as it reaches us from those enormous distances. (The



pitch of the whistle of a railway engine rises as it approaches us and falls as it recedes. In similar fashion, the frequency (and colour) of light changes as the source from which it comes moves towards or away from us. If it moves away colours move towards the red end of the spectrum and vice versa.)

Red shift is a matter of observation. But calculations based on it make certain assumptions that may or may not be justified. Speed is a matter of time and distance. Suppose, for the sake of argument, that ordinary or Newtonian time is only true when used for speeds over short distances. Clearly, we might, in such cases, make quite big mistakes when calculating the speed of things distant from us by millions of light years.

It is here that Milne comes into the picture. He urges that if we use the log of ordinary time the apparently abnormal speeds of far distant galaxies will at once come back to more normal proportions. There is a useful analogy in simple statistics. If a distribution curve has a long drawn-out tail to the right and a short sharp descent to its origin on the left, we can usually bring it to more normal appearance by using logs along its base-line. This compresses the tail and extends the curve on the side where there is the sharp descent.

In similar fashion, the use of log time means that we 'compress' the apparently excessive speeds in question, bringing them back to more normal rates of travel.

There is an element of arbitrariness in our approach to these matters. We 'decree' or 'demand' that the tail of a skewed curve should be compressed. We want to reduce the apparently abnormal speeds that seem to be characteristic at the fringe of the universe, compressing them to make them conform more to our pre-established notions of what is fitting in these matters. Whether we are justified in those preconceived notions is not always apparent.

Although I have only postulated log time on the mental side in terms of short sharp bursts of mental work it can presumably be held to hold over much longer periods. Thus, for example, a year to the child of four is a quarter of a lifetime. It is perhaps for that reason that it seems to him to be unending. To a man of forty it is merely a fortieth of a lifetime, and consequently seems to race by.

Jeans put the same problem from the physical side when discussing the age of the stars. The bigger they are, the greater the rate at which they pour out their substance in the form of radiation. But as they expend at a rate proportional to their masses at the moment it follows that

A sort of parsimony seems to creep over the stars in their old age; so long as they have plenty of weight to squander, they squander it lavishly, but they contract their scale of expenditure when they have little left to spend. The sand runs slowly through the hour-glass when there is little left to run.

(2), pp. 179-80.)

After noting that the sun now seems to be slowing down almost imperceptibly, Jeans went on to say it has hardly changed in the last two thousand million years. But before that, looking further and further back into its history, one might imagine an ever-increasing tempo:

When we go back . . . a new phenomenon appears; the weight of our hypothetical past sun begins to go up by leaps and bounds . . . it begins to double, and more than double, every 100,000 million years, and we cannot go back as far as eight million million years without postulating a sun of quite impossibly high weight. The sun must, then, have been born some time within the last 8 million million years.

(Ibid. p. 181.)

For a human being the picture is analogous, save that the newly fertilized egg is very

small, the change being towards increase in size. To begin with, the rate of change is high. The infant is soon big enough to be born. Through infancy it develops, but at an ever decreasing rate. When it comes to maturity it is changing so slowly that we cannot say just when the moment of full development is reached. Both with the stars, therefore, and with humans the picture is the same. Time moves quickly to begin with, thereafter slowing down—if measured with an ordinary clock.

Jeans having been quoted on the subject, it will be as well to give a short extract from Milne, especially as it will put his  $t_0$  in due perspective:

It would appear that the extra-galactic nebulae separated from one another at a time given by the ratio of the distance to the recession velocity as about  $2 \times 10^9$  years. This, in  $t$ -measures, would be the 'date of creation'. But an infinity of other systems of time-keeping are also legitimate... the choice of a time scale never affects phenomena, but only the description of phenomena. (3), p. 60.)

There is here a definition of  $t_0$  as the age of the universe. It thus compares with my own  $T_0$  which marks the inception of a mental process.

Milne's mention of many possible systems of time-keeping brings to mind the fact that in my own work I have found (as it were) many different 'times', each starting from its own  $T_0$ . Even within one apparently continuous laboratory task, starting from its own  $T_0$ , a disturbance may see the setting up of fresh waves of output, waves needing to be assessed as from their own  $T_0$  at the point of disturbance. In this sense there is a separate 'time' for every event. If we can assume the same kind of thing to occur in the processes of life in general, we may say that a time scale begins when the child is conceived, another at the moment of birth, another when he goes to school or leaves school to start life on his own, and so on. Always, there is a quick rush to begin with, with a slowing thereafter in respect of the given process. Thus Milne's  $t_0$  is possibly a limiting case, going back, as it does, to the moment of creation.

## II. THE NEED FOR TWO PSYCHOLOGICAL CONSTANTS

I have already illustrated the general field within which they occur,  $T_0$  being a convenient datum point or zero from which to run a scale of log time with  $p$  as unit. It is perhaps interesting to note that whereas  $T_0$  is paralleled to some extent by Milne's  $t_0$ , my own  $p$  seems to stand alone as a natural unit of log time.

The need for the two constants can be illustrated on purely general grounds. Consider therefore two fundamental findings as follows: (a) curves of mental output based on single experiments differ widely in outline, although (b) grand total curves (based on many hundreds of experiments) tend to resemble one another in the times at which their crests and troughs occur. These findings were first put on record in 1929 in the abstract of a paper read to the British Association (4). I there drew the necessary deduction, namely that resemblances under (b) mean that each and every grand total curve must be approximating to an ideal or standard pattern in the arrangement of its ups and downs.

As I then had no coherent theory to explain the findings I contented myself at that time with pointing out that an 'imposed' rhythm weak in the single cases under (a) might, nevertheless, build up and become apparent in the grand totals mentioned under (b) (see supposition C, p. 146 below).

Looked at more closely, finding (b) will be seen to imply that there is relative absence of damping in grand total results. For were the curves from single experiments chance-determined in their ups and downs the result of adding a thousand or so of them would be



a completely damped or smooth grand total curve. In fact, grand total curves do *not* damp down in this way—a fact easily put to test by the method of analysis of variance. (Evidence along this and other lines is given in a recent article in this *Journal* (6).)

The theory I finally put forward (5) was simple. Let there be a pool of oscillators, each of characteristic period and trough sequence. Suppose that when they begin an experiment, subjects Jones, Smith and Brown each take a random group of those oscillators into use, the others remaining in reserve because of fatigue or some such cause. It follows at once that on this basis of random sampling they will get different curves for each different sitting at the task. We thus cover finding (a). We also cover finding (b), for the sum of a large enough number of such single curves will give a grand total of standard pattern, a pattern definable as that given when all the oscillators are simultaneously excited.

It is necessary to suppose that all people draw from the same pool. For a grand total curve based on the work of many subjects resembles that based on the work of one. It is also necessary to suppose that periods and phase are rigidly constant. For were they variable the grand total curve would inevitably be damped.

With these thoughts in mind we can at once deduce the need for  $T_0$  and  $p$ . The argument is extraordinarily simple. Assuming that the periods of the hypothetical oscillators are fixed and invariable, it follows that they must either be commensurable or not. If they are, their L.C.M. will serve as a unit. Call it  $p$ . Or again, if trough sequences are fixed, they will either share a universal common trough at some given point or not. If they do, let it occur at the time  $T_0$ . In that simple fashion I arrived at the notion of  $T_0$  and  $p$  long before appropriate numerical values were determined for them. The theory or picture I had in mind demanded them; I therefore looked for them.

The object of the present paper is to carry the problem further. Supposing, for the sake of argument, that my original measures were illusory or illegitimate, is it to be expected that the numerical values of  $T_0$  and  $p$  would be simply related to well-established physical constants? Supposing, on the other hand, that they are real expressions of underlying natural processes, is it then to be expected that they would be related to these physical constants? Without arguing further about either supposition, I inquired whether such relations could in fact be shown to exist.

### III. POSSIBLE RELATIONS WITH PHYSICAL CONSTANTS

The impetus to this inquiry came from a few people, to whom my thanks are due. Dr L. F. Richardson, F.R.S., set the ball rolling by sending me the notion here used as case I. I showed it to Prof. H. Dingle, who gave me case II, using it as an illustration of the fact that other such relations were possible. He also noted some of the difficulties, as, for example, that of getting the right dimensions (a thing case II fails to do). Rather to his amusement, I think, I thereupon took all the physical constants I could find, combining and re-combining them with a fine disregard for dimensions to show that one could easily make some of them seem to 'produce' my own  $T_0$  and  $p$ .

Coming back to more serious vein, Dr J. O. Irwin suggested case III. He noted that the dimensions are here appropriate. For reasons that will be apparent, I immediately combined cases I and III to get case IV. Finally, I added case V to get the relation between Milne's  $t_0$  and my own  $T_0$ .

In reading through the various formulae it should be remembered always that there are difficulties. As Dr Richardson pointed out in a recent letter to me, the object of his

original suggestion (case I) was really to draw attention to the absurdity of trying to determine electronic constants by psychological experiments. In the light of such warnings consider therefore the following cases:

*Case I.*  $T_0$  is nearly enough the time taken by light to travel a distance equal to the circumference of an electron.

The electron is no longer regarded as of fixed and invariable size in the ordinary sense. But the conventional 'radius' is well known. It is

$$\frac{2}{3} \frac{e^2}{mc^2}, \quad (5)$$

where  $e$  and  $m$  are the charge and mass of the electron respectively,  $c$  being the speed of light. Multiplying by  $2\pi$  to get the circumference and dividing by  $c$  (to get the time taken by light), we arrive at

$$T_0 = \frac{4}{3} \frac{\pi e^2}{mc^3} = 3.9372 \times 10^{-23} \text{ sec.} \quad (6)$$

This value for  $T_0$  does not differ appreciably from the empirical figure given in equation (3) above.

*Case II.* Planck's constant  $h$  relates the frequency of radiation with the accompanying quantum of energy. If, for example, the frequency is  $\nu$ , the quantum will be  $h\nu$ . If we are given the period, then, remembering that frequency is the reciprocal of period, we simply divide by the period. The answer is the same.

The constant  $T_0$  is a time in seconds. In equation (7) it is divided into  $h$  to get the quantum that would be associated with physical radiation of that period:

$$\frac{h}{T_0} = 0.00016 \text{ ergs.} \quad (7)$$

Were it not that the answer is here in ergs one would be tempted to remember that  $p = 0.0016$  (to base 10), thus being further tantalized with the desire to write the equation  $h/T_0 = p/10$ . But the dimensions are wrong. The constant  $p$  is logarithmic, i.e. it is a number, whereas the answer in equation (7) is in ergs. Incidentally, this is the only one of the five cases where the dimensions are *not* appropriate.

*Case III.* The fine structure constant ( $\alpha$ ) is  $\alpha = 136.995$  or  $137$  approximately. It has no dimensions, being a number. It usually appears in the form of its reciprocal which, numerically, is very nearly  $2p$  as shown in (8):

$$p = \frac{1}{2\alpha} = \frac{1}{274} = 0.00365. \quad (8)$$

Arithmetically, the agreement is extraordinary, as is seen when we compare expression (2b). (We have here used  $p$  to base  $e$  as one would expect in theoretical work.)

The case becomes more interesting when we inquire into the formula for the fine structure constant. It is

$$\alpha = \frac{hc}{2\pi e^2}. \quad (9)$$

From this we get a theoretical equivalent for  $p$ , namely,

$$p = \frac{1}{2\alpha} = \frac{2\pi e^2}{2hc} = \frac{\pi e^2}{hc}. \quad (10)$$

As we have just said, the fine structure constant usually appears in the form of its reciprocal, so there is nothing strange in having to turn it upside down when equating with  $p$ . As a further point that seems to indicate a close degree of underlying agreement we may note that the fact that  $p = 1/2\alpha$  means that the two coefficients cancel out in equation (10),



leaving  $p$  equal to an expression containing just the three physical constants together with the ubiquitous mathematical constant  $\pi$ . If this is a coincidence it is very remarkable. Had there been an intractable numerical coefficient (as perhaps 0.823 or something of the kind) then equation (10) might well have been meaningless. As it is, we have to regard it with respect. (Two can be made equal to six by multiplying it by three. It can be made equal to any other number whatsoever if we choose the right coefficient. It is the absence of a coefficient in equation (10) that makes it so interesting.)

*Case IV.* Equations (6) and (10) have a common nucleus  $2\pi e^2/c$ . It follows that  $T_0$  can be expressed in terms of  $p$ , or vice versa.

$$T_0 = \frac{4}{3} \frac{h}{mc^2} p. \quad (11)$$

It was a new thought to me that  $T_0$  and  $p$  could conceivably be related in any such way. Case II seemed to imply a linkage of the kind, but the dimensions being wrong, one did not treat the suggestion seriously. In equation (11) the dimensions are right and it is quite possible there may be something behind the apparent relation.

It is true there is the coefficient  $4/3$ . As we said a moment ago, coefficients of the kind are inconvenient, but as it came with the formula for the circumference of an electron we may perhaps ignore it. More interesting is the expression

$$\frac{h}{mc^2}. \quad (12)$$

Its denominator represents the mass of an electron multiplied by the square of the speed of light. Even those of us who are not physicists may remember the  $mv^2$  of our schooldays. Clearly,  $mc^2$  is a measure of energy. By definition it is the total available energy of an electron. Going back to equation (11) we see that the said quantum is there divided into Planck's constant  $h$ . That means that the answer in equation (11) must be a time. It is an appropriate answer, for  $T_0$  is a time. But the time in (11) is also a period. It is the period of oscillation of an electron. In words, therefore, equation (12) tells us that  $T_0$  is  $4/3$  times  $p$  multiplied by the period of oscillation of an electron. With this we run up against something that might be of importance if we could but understand it.  $T_0$  and  $p$  derive from the curve of mental oscillation. In equation (12) we seem to find them related by the period of oscillation of the electron. It could be a very appropriate notion if only we could devise a suitable theory.

*Case V.* The problem here is the ratio between my own  $T_0$  and Milne's  $t_0$ . The one is very small; the other correspondingly large. Dividing one into the other we get

$$\frac{t_0}{T_0} = \frac{6.3 \times 10^{16}}{4.076 \times 10^{-23}} = 1.57 \times 10^{39}. \quad (13)$$

A few extracts from Eddington (to be given in a moment) will illustrate the possible significance of a number as great as  $10^{39}$ . Here we may make a couple of formal notes. One is that  $1.57$  is almost  $\pi/2$ . In other words, equation (13) could conceivably be rewritten as

$$\frac{\pi}{2} \times 10^{39}. \quad (14)$$

Just what that might mean one cannot say. The second point is that  $t_0$  is not a fixed time. It is the age of the universe as defined in the extract from Milne on p. 140. If, therefore,  $T_0$  is strictly constant its ratio to  $t_0$  will get smaller and smaller as time goes on. Conversely, if we look back into the distant past it will get larger, there being a moment when  $t_0$  and

$T_0$  are equal and the ratio becomes unity. It is conceivable that the ratio between the two times in equation (13) is constant. In such a case, my own  $T_0$  must be getting bigger as well as  $t_0$ . Equation (14) could quite possibly express such a state of affairs, the value  $\pi/2$  remaining constant.

But we are now simply guessing. Without a theory as to the true state of affairs we cannot answer questions, although, as obviously, if we could collect enough possible relations, we might be able to weld them together sufficiently to give a *possible* theory. It is at moments such as this that one appreciates the part played by preconceived ideas in these matters!

#### IV. GENERAL DISCUSSION AND FURTHER PROBLEMS

In the last section, five cases were described in all too summary a fashion. It will now be necessary to pause for a moment to study a few related problems.

In making pioneering inquiries it is always instructive to look at analogous cases in the history of science. Consider, for example, the difficulties met with by early workers on electricity and magnetism. In those fields it was not easy to make measures at all, much less to arrive at suitable units or to link them with the centimetre-gram-second system of units. Most of those early difficulties have now been overcome, but even so there are still three systems of measurement with conversion tables to enable us to pass from one to the other.

The difficulty of dimensions is perhaps more important to us at this moment than that of units. In psychology we only have that of time ( $T$ ). In physics, there are length ( $L$ ) and mass ( $M$ ) as well as time ( $T$ ). It may seem almost absurd to look forward to a time when we shall express things mental in terms of length and mass. Yet more extraordinary things have happened. The analogy with the fields of electricity and magnetism is again obvious. The most obvious line of advance in mental measurement is to attempt a working assessment of mental energy. If this could be obtained, and if it could be related to physical energy, we should be on the way to a solution of the problem of dimensions, for, as is well known, the dimensions of energy are  $L^2M^2T^{-2}$ . Not that one would necessarily want to express things mental in terms of mass or length as such. Our present concern is the formal problem of linking the various fields.

To return to the problem of units, the constant  $p$  has served as a quite useful unit of log time. Thus, for example, it was shown in discussing the trough sequence given as equation (3) above that its log period is  $0.2880 = 180p$ . To use  $p$  as a unit in this way was so obvious that one merely slipped into the habit. On the other hand, there is no knowing why  $p$  is the size it is. Granted that equation (8) suggests that it is  $1/2\alpha$ , we have still to discover just why it is related to  $\alpha$  at all.

$T_0$  has not functioned as a unit. It has been a convenient zero point on the scale of log time. Curiously enough, however, it is very simply related to two possible natural units, one of length the other of time. Thus, for example, the *radius* of the electron has been suggested as a natural unit of length. As we shall see, it was so used by Eddington. In similar fashion, the time taken by light to travel that unit of distance might well be a unit of time. But from case I we know that  $T_0$  is the time taken to travel the *circumference* of an electron. So that if length and time are referred to the radius it follows that  $T_0$ —while not a unit in itself—is, nevertheless,  $2\pi$  times the unit based on the radius.

We have several times said that  $p$  has been used as a unit of log time. It may, of course,



be a multiple of a more natural unit. One cannot say. Nor is it possible to hazard even a guess as to why it is related to  $T_0$  as in equation (11). There may be something hidden in that equation that will throw light on both constants, but with no general theory it is pure guesswork to attempt to explain any of these things. One cannot make bricks without straw.

In closing, it will be interesting to look at some of the points made by Eddington, when (knowing what he might expect to find, and having a general theory wide enough to tell him what might conceivably be happening, whether in the universe or in the atom) he attempted to relate the atom to the universe.

He began with  $R$  the radius of curvature of empty space and  $N$  the number of protons and electrons in the universe. Taking the first jump from the almost infinitely large to the almost infinitely small, he noted that  $R$  is of the order of  $10^{27}$  cm. This has to be compared with  $10^{-8}$  cm. for the radius of the hydrogen atom. The ratio between them is of the order of  $10^{27}/10^{-8} = 10^{35}$ . This is a really enormous number (1 followed by 35 noughts) and the next step was to match it among known quantities. He suggested the ratio of the electrical force between a proton and an electron as compared with the gravitational force between them:

According to classical theory the ratio is  $2.3 \times 10^{39}$ . I have long thought that this must be related to the number of electrons and protons in the universe and I expect the same view has been entertained by others. Since  $N$  is about  $10^{79}$  the above ratio is of the order  $\sqrt{N}$ . (loc. cit. p. 108.)

Having introduced  $R$  and  $\sqrt{N}$ , Eddington next made use of them in building a natural unit of length. This he got by taking  $R/\sqrt{N}$ , calling it an adjusted standard of length. Of it he said:

I think I have identified the adjusted standard...disguised as the expression  $e^2/mc^2$ ...this expression is well known to be of the dimensions of a length; in fact,  $2e^2/3mc^2$  used to be called the 'radius of an electron' in the days when the electron was conceived more substantially than it is now.... (Ibid. p. 108.)

From this he went to the equation

$$\frac{R}{\sqrt{N}} = \frac{e^2}{mc^2}. \quad (15)$$

A little later he turned to an adjusted unit of mass. Calling it  $m_e$  as distinct from  $m$ , he substituted for it in equation (15). Turning the fraction upside down he arrived at

$$\frac{\sqrt{N}}{R} = \frac{hc}{2\pi e^2} m_e. \quad (16)$$

Glancing back at equation (9) we find that  $\alpha$ , the fine structure constant, is appearing on the right of equation (16). Eddington remarked on the fact, discussed it and went on to get the mass of the proton and of the electron from his formulae. Into that we need not follow him, for we have seen all we need in equations (15) and (16), namely that he used the radius of the electron and the fine structure constant just as we have used them in cases I and III of our last section.

Summing up so far, I would make at least four major points. The first is that Eddington sought a ratio big enough to give him the number  $10^{39}$ . It was required to link the radius of curvature of empty space with the radius of an atom. Curiously enough, our present case V gives it when relating Milne's measure of the age of the universe with my  $T_0$ . In both cases, there is a link between the universe and something very small. Secondly, Eddington used the conventional radius of the electron as a unit of length. In our present

case I it was linked with  $T_0$ . Thirdly, Eddington used the fine structure constant; case III linked it with  $p$ . Fourthly, Eddington linked the universe to the atom using the measures just mentioned. Clearly,  $T_0$  and  $p$  could be linked with measures of the universe in the same way.

The problem of coincidences must next be examined. If the number 3.1416 occurs one is entitled to inquire if  $\pi$  is involved. This is not necessarily because that is the value of  $\pi$ . The problem is more a matter of *meaning* than of mere arithmetical equality. The value 3.1416 might come exactly and yet by mere chance, so not being significant of anything. On another occasion the coming of even a rough approximation to that value might be of first importance as indicating the presence of  $\pi$ . Throughout this present discussion we are in difficulties, because of the absence of a theory; because the relations observed are of arithmetical equality rather than of logical relation between the underlying mental and physical processes.

The problem is so wide that it has seemed best to tabulate some of the possibilities. Consider, therefore, the following 'Suppositions', labelled A, B, C and D to distinguish them from the five cases of our last section:

*Supposition A.* The curve of mental output is chance-determined as far as its ups and downs are concerned.  $T_0$  and  $p$  would therefore be figments of the imagination. It follows:

- (i)  $T_0$  need not have been of atomic order of size. Since it is so, there is a coincidence, one helping to build up a notion (illusory) of relationship with things atomic.
- (ii) The fact that there is almost complete arithmetical agreement in case I will be another coincidence.
- (iii) In similar fashion, the apparent relation of  $p$  with  $\alpha$  in case III must be a coincidence.
- (iv) Granted (ii) and (iii) the apparent linkage between  $T_0$  and  $p$  in case IV would follow. It is not an additional coincidence for the purpose of assessing the odds against chance. Nevertheless, there is a coincidence of logical meaning in that they are related through the period of oscillation of the electron.
- (v) There are many constants that might have been involved. On a purely chance basis we need not have happened on just those that make it easy to suggest a linkage with Eddington's inquiry into the relation between the atom and the universe. There is here again a coincidence lending itself to a possible logical relation rather than one of arithmetical equality.

*Supposition B.* Curves are chance-determined as under A, but a slight rhythm (or rhythms) is imposed on all or most of the single curves, hardly perceptible in them, but becoming obvious in grand total curves. In such case,  $T_0$  and  $p$  would presumably express the system of the imposed rhythm. It follows:

- (i) The imposed rhythm (or rhythms) must have been rigidly constant. They could only be so if they were dependent on experimental timings, i.e. on one's watch or clock, etc.
- (ii) Such rhythms, if dependent on the clock, would be in ordinary or Newtonian time.
- (iii) The rhythm or rhythms must be imposed under all conditions of experiment (in practice, we have done many different kinds of mental work under all kinds of conditions. This fact really throws this supposition out of court. However, it can be stated formally).
- (iv) Following on B (ii) above,  $T_0$  and  $p$  would presumably express the relation between trough sequences and measures of period true in Newtonian time but expressed (presumably with distortion) in log time.
- (v) Generally, the arguments given as A (i) to A (v) are here applicable.

*Supposition C.* It is assumed that my theory of the curve is valid, there being a wave system in log time expressed in terms of  $T_0$  and  $p$ . On the other hand, it is assumed that there is no relationship with physical constants. It follows:

- (i) By admitting  $T_0$  and  $p$  we are committed to the acceptance of regularities in the curve of mental work far surpassing those found in any other field of mental work. We are committed to the notion that there are no individual differences in respect of period or phase.
- (ii) Generally, arguments A (i) to A (v) apply.



*Supposition D.* As in C, but with admitted relations between mental and physical constants. It follows:

- (i) The difficulty under C (i) disappears.
- (ii) Arguments A (i) to A (v) no longer apply; although
- (iii) we are left with the need to make a theory that will make this present supposition seem reasonable.

Looking over the various possibilities the first thing that strikes one is that the first three suppositions seem to be all open to objection. Even supposition C, which one might have expected to be more acceptable than supposition A, seems to be no more free from objection.

Putting the matter as briefly as possible, I would note that suppositions A and B were rejected in the very early stages of the work as being unlikely. It is true that, to begin with, there was not as much statistical evidence as one can command to-day. They can now be dismissed on statistical grounds alone. But even by standards of general plausibility they seemed too shaky to admit. I make the point because supposition C seems to be as shaky on logical grounds. The main argument derives from supposition C (i). I have long felt that the absence of individual differences is crucial. We are so accustomed to finding wide individual differences in things quantitative that it comes as a shock to hear that there are none in this matter of the two constants. As long as we *expect* individual differences; as long (in effect) as we *demand* them, so long will it be impossible to explain the fundamental findings (a) and (b) of p. 140 above.

Suppose, therefore, we make the obvious assumption, namely that  $T_0$  and  $p$  must derive in some way from bodily happenings so constant and so regular that they cannot depend on ordinary psychological processes, or, as far as that goes, on ordinary physiological processes. Clearly, we shall have to go down to, shall we say, the atomic level to find happenings as constant and as regular. I use the term generally. It is not for me to try to distinguish between molecular, atomic and subatomic levels. All I wish to do is to indicate where regularities of the kind may be expected.

In other words, I suggest that the impasse indicated in supposition C (i) absolutely compels us to shift to a position more nearly expressed by supposition D. Moreover, the impetus comes not from apparent coincidences in cases I to V, but from something that preceded them by 20 years, namely the fundamental findings (a) and (b) of p. 140. With those findings it is not possible to meet the demand for individual differences. We may as well, therefore, face up to the fact and move to a more tenable position.

That we move across to supposition D does not commit us to blind acceptance of the apparent relations indicated in cases I to V. We are at liberty to criticize any or all of them. But we must be prepared to find some or all of them ultimately acceptable—if and when the evidence accumulates.

## V. SUMMARY

We have found quite close relations between the psychological constants  $T_0$  and  $p$  on the one side and certain physical constants on the other, but in no case is there any evidence that they are more than accidental arithmetical equalities.

On the other hand, there are too many such apparent coincidences to make one happy with a purely negative judgement. Moreover, there is the fact that  $T_0$  and  $p$  bespeak regularities in the curve of mental work that cannot possibly be explained in terms of ordinary psychological processes. The regularities in question are much more likely to be due to physical or chemical processes.

On the whole, it is suggested that we must expect relations of the kind here described. The difficulty is that we have no theory justifying us in accepting this relation or that. There is an obvious need in general, but no picture of what could be happening in particular. An interesting result is that as our five cases accumulated it became apparent that the main physical constants involved were precisely those used by Eddington to link measures of the universe with those of the atom. In other words, we may be bringing universe, atom and mind together in one unity. Even that is but a hope. Without a general theory we can decide nothing.

# VI. TABLE OF CONSTANTS

| Symbol                | Quantity                                            | Value                                        | Dimensions |               |          |
|-----------------------|-----------------------------------------------------|----------------------------------------------|------------|---------------|----------|
|                       |                                                     |                                              | <i>L</i>   | <i>M</i>      | <i>T</i> |
| <i>e</i>              | Electron charge                                     | $4.8023.10^{-10}$ e.s.u.                     | $3/2$      | $\frac{1}{2}$ | -1       |
| <i>h</i>              | Planck's action quantum                             | $6.622.10^{-27}$ erg. sec.                   | 2          | 1             | -1       |
| <i>c</i>              | Velocity of light                                   | $2.99774.10^{10}$ cm. sec. <sup>-1</sup>     | 1          | 0             | -1       |
| <i>m</i>              | Mass of electron                                    | $9.1078.10^{-28}$ g.                         | 0          | 1             | 0        |
| $\alpha$              | Fine structure constant                             | 136.995                                      | 0          | 0             | 0        |
| <i>R</i>              | Radius of curvature of empty space                  | $1.54.10^{27}$ cm.                           | 1          | 0             | 0        |
| <i>N</i>              | Number of protons = number of electrons in universe | $1.29.10^{79}$                               | 0          | 0             | 0        |
| <i>p</i>              | Unit of log time (Philpott)                         | 0.0016 (base 10)<br>0.00368 (base <i>e</i> ) | 0          | 0             | 0        |
| <i>T</i> <sub>0</sub> | Zero point on log time scale (Philpott)             | $4.076 \times 10^{-23}$ sec.                 | 0          | 0             | 1        |
| <i>t</i> <sub>0</sub> | Zero point on log time scale (Milne)                | $6.3 \times 10^{18}$ sec.                    | 0          | 0             | 1        |

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# AN EXPERIMENT ON IMMEDIATE RECALL IN SECONDARY SCHOOL CHILDREN

By LUCY DUGGAN, *University College, Cork*

I. *Introduction* (p. 149). II. *Observational noting* (pp. 149–150). III. *Word memory* (p. 150). IV. *Number memory* (p. 151). V. *Summary of results* (p. 151). VI. *Discussion* (pp. 152–154). VII. *Summary* (p. 154). *References* (p. 154).

## I. INTRODUCTION

A test in Immediate Recall was carried out on the Intermediate Certificate pupils of six secondary schools in Cork City during January 1947. The children examined were between 14 and 16 years old; they numbered 223 (106 boys and 117 girls). No attempt was made to select in any way the children who were examined. School attendance in Cork City is compulsory up to the age of 16. Children between 14 and 16 attend either secondary or vocational schools; the distinction between them is more likely to be social than intellectual. In the smaller schools, all the fourth-year children were included in the experiment; in the larger, the exclusions were made solely at random. The children were examined in groups of from 18 to 25.

Though neither reward nor punishment was mentioned as an incentive, all the children showed a lively interest in the experiment, probably on account of the novelty of the activity, and each seemed determined to give his best possible performance.

The test in Immediate Recall was divided as follows: (a) observational noting, (b) word memory, (c) number memory. The material consisted of familiar objects, of well-known words and of numbers, but there was no logical continuity between the items to be memorized.

## II. OBSERVATIONAL NOTING

A group of common objects, ranging in number from nine to twelve, were held up one after the other and named by the investigator, each object being exposed for about 2 secs. This was done twice. The objects used were a pencil, a match-box, a nail, an apple, a button, a ball, a toffee, a ruler, a penny, an envelope, a book, a thimble. The same order of presentation was observed for each of the two exposures, but the order was changed for each group of children. The objects were then removed from sight and the children were asked to write down as many of the things as they remembered.

The following were the main results:

(1) The average percentage of the presented objects remembered immediately after—computed on the proportion of total units remembered to total units exposed—was 87%.

(2) The percentages—computed as above—remembered by groups to whom nine, ten and twelve objects were shown were respectively 95% (groups of 20 girls), 89% (mixed groups of 109), 83% (mixed groups of 93), the percentage remembered thus varying inversely with the number of objects presented.

(3) The observational noting of girls was distinctly better than that of boys. Girls remembered 90.3% of the presented objects, boys 83%. With the exception of the button all the objects, even the nail, were remembered by a higher percentage of girls than boys.

This result is in accordance with the opinions of District Justices D. B. O'Sullivan, of Cork, and D. Gleeson, D.Litt., of Limerick, also of the Senior Detective Inspector of Union Quay Barracks, Cork; all of these agree that, where court testimony is concerned, women witnesses usually surpass men in the amount and accuracy of their description in evidence. This is true, they say, not only of place, personal and positional descriptions, but also of narration of events and conversation and even of estimation of numbers and space.

(4) Of all the objects, the apple made the deepest impression, being remembered by 222 out of 223; the toffee came a long way behind this, being reported by 184. The penny was most often forgotten, being remembered by only 168, and the ruler was in the second last place. Next in favour to the apple came the button and ball, then the pencil. Frequency of remembering any one object cannot be attributed to the order of exposure as this was, as mentioned, changed for each group.

(5) 55 children, about a quarter of the total, noted the maximum number of objects presented, 44 girls and 11 boys.

### III. WORD MEMORY

This experiment was suggested by the investigations of Lobsien and Netschajeff, described by Rusk<sup>(1)</sup>. Ten trisyllabic words denoting objects usually apprehended visually were read slowly twice to the group. The articulation of each word came at intervals of about  $1\frac{1}{2}$  sec. The children were then asked to write down as many of the words as they remembered. The words used were: calendar, elephant, decanter, pinafore, daffodil, kangaroo, blackberry, cigarette, saxophone, skeleton. The order of words was varied for different groups. To one group of 26 boys the word 'sycamore' was added, bringing the number of words to eleven. During the reading of the words, articulatory movements were to be observed frequently—more in girls' groups than in boys'—while the subjects were listening to the words being spoken.

The following were the main results:

(1) The percentage of words remembered was 75%. The percentage remembered by the 26 boys who got eleven words was 72.7. This is slightly more than the boys' average percentage, but it cannot be taken as indicating that eleven words rather than ten give better results; the group in question seemed to be more wide-awake than the average and to be making a great effort.

(2) Girls showed better word memory than boys. They remembered 78% as compared to 72% remembered by boys; all words excepting 'cigarette' and 'blackberry' were remembered by a greater proportion of them.

(3) Wide differences appeared in apparent memorial preference. 'Pinafore' came first, being remembered by 186 out of 223, and was closely followed by 'elephant' (184). 'Kangaroo', on the other hand, came last but one. 'Daffodil' came last of all, more than half the boys failing to report this and only 62% of the girls. 'Saxophone' was popular, 'decanter' distinctly unpopular; 'skeleton' had a fair popularity. (Full results are appended in section V.)

(4) In cases where subjects were unable to remember the full number of words—and these were an overwhelming majority—no invention of words appeared.

(5) Twelve children remembered the maximum number of words heard, four boys and eight girls.



## IV. NUMBER MEMORY

Ten two-digit numbers were read slowly three times to the group. The children were then asked to write down as many of the numbers as they remembered. The numbers used were: 53, 67, 29, 45, 18, 36, 72, 98, 51, 44. The order of presentation was changed from group to group.

The following were the main results:

- (1) The percentage of numbers remembered was 70%.
- (2) The boys' memory for numbers was better than the girls'; the boys reported 72%, the girls reported 67%.
- (3) Strong preferential differences appeared in the reproduction of numbers, and the range of frequency of report was practically as great as in the words. 18 came an easy first, being reported 193 times; this was followed by 44 (179). At the other end, came 36 (134 times) and 67 (139). 98 and 67, in spite of their historical associations, came only sixth and ninth respectively. 45 and 72, profiting nothing by factorizability, came respectively seventh and eighth.
- (4) Invention was frequent when students realized that they could not think of all the numbers. Extreme cases were: 5 numbers reported correctly, 5 invented; 3 correct, 5 invented; 4 correct, 5 invented; the worst case was 2 correct and 9 invented.
- (5) Seventeen children reproduced all ten numbers; only five of these were girls.

## V. SUMMARY OF RESULTS

Table 1 shows the number of children by whom the various objects, words and numbers were remembered immediately afterwards. This table pools results from all experiments, including those with nine, ten and twelve objects.

Table 1. *Number of children remembering correctly*

| I. Object | No. of children | II. Word   | No. of children | III. Number | No. of children |
|-----------|-----------------|------------|-----------------|-------------|-----------------|
| Apple     | 222             | Pinafore   | 186             | 18          | 193             |
| Button    | 218             | Elephant   | 184             | 44          | 179             |
| Ball      | 197             | Saxophone  | 180             | 29          | 163             |
| Pencil    | 195             | Cigarette  | 169             | 51          | 163             |
| Nail      | 191             | Blackberry | 168             | 53          | 160             |
| Match-box | 190             | Skeleton   | 163             | 98          | 154             |
| Toffee    | 184             | Calendar   | 162             | 45          | 147             |
| Envelope  | 183             | Decanter   | 159             | 72          | 146             |
| Ruler     | 180             | Kangaroo   | 157             | 67          | 139             |
| Penny     | 168             | Daffodil   | 123             | 36          | 134             |

Strongly marked variations in the different aspects of memorial power appeared constantly. A girl who remembered all twelve objects and eight words could record only two numbers; one who remembered ten objects and nine words could only record two numbers; another who recorded a maximum in objects and words could produce only half the numbers. These scores are typical of the records of many girls whose object and word memories were on the whole far better than their number memories. A boy who remembered all the objects and numbers presented could recollect only five words; one who remembered nine objects and ten words recorded only three numbers.

## VI. DISCUSSION

In any test for immediate memory, we find ourselves in the realm of spontaneous recollections; the response, therefore, may be taken as a reflexion of the subject's attitudes and interests, as well as of the effort which he is making to imprint. There can be no question here of learning by repetition.

For the girls, words had far more memorial significance than numbers; they remembered 78% of the words and only 67% of the numbers. For the boys there seemed to be no difference in the memorability of words as compared to numbers, and their performance at both was exactly the same, 72% for each. Boys, therefore, were better than girls at remembering numbers; girls better than boys at remembering words.

As regards objects, both boys and girls gave far better performances, the girls being superior by about 10%. All were helped, no doubt, by their visual memory images of the actual objects presented. On the general result of all three tests, the girls were slightly better than the boys, their superiority in observational noting and in word memory more than making up for the boys' superior memory of numbers, but an analysis of variance for the test result showed no significant difference between sexes on the results for the tests in immediate memory.

The span of immediate memory, as observed in this experiment, was greater than that usually ascribed to unpractised subjects. Meumann (2), for instance, asserts that unpractised adults can 'immediately reproduce' eight or ten letters at most. In the Cork experiment one boy, no. 101, remembered and recorded eleven trisyllabic words, three boys and eight girls remembered ten—the maximum number presented to them. Twelve boys and five girls were able to record ten two-digit numbers. Immediate retention had probably not reached its maximum power in the children who took part in the experiment; according to Meumann (2), it is less efficient in children than in adults and it continues to develop up to the age of about 15. With the constant training it receives in schools, it probably continues to improve up to the age of about 19.

Better performances might possibly have been obtained if the children had been required to reproduce orally the objects, words and figures they remembered. In the verbal test especially, though all the children were specifically reassured on the point, difficulties with spelling may, in a small number of cases, have prevented them from recording words which they remembered on the ear. There was some evidence, especially from boys (who seemed to be more sensitive than girls about making mistakes), that they remembered or half-remembered words of which they wrote only one or two letters. To test orally, however, would have necessitated individual examining; it would have taken far more time and would have been more upsetting to the school routine. Again, owing to prevailing methods of teaching, the children were likely to concentrate more closely and to be far less flustered if they were armed with pencil and paper.

Strong differences in memorial preferences appeared in the results of all three subdivisions of the test in immediate memory. As we have seen the net results were that, by a sweeping majority of subjects, certain of the objects, certain of the words and certain of the numbers were memorially preferred to the others. Outstanding examples were the apple and button among the objects, the words 'pinafore' and 'elephant', and the number '18'.

The superior memorability of the two preferred objects could have had little to do with



the objective nature of the stimulus they afforded. The apple was not handsome, being green and (it was after Christmas) wizened; the button was brown and inconspicuous. There seems to be no objective reason therefore why they should have been remembered and the envelope and penny forgotten. Voluntary effort was clearly applied equally to the temporary retention of all the objects. Their being given strong preference in remembering must presumably be explained by the subjects' interests and attitudes.

Differences in memorial preferences for words could probably be accounted for also by interest and attitude; the sound of the word may have been a factor as well. A pinafore had entered into the lives of most of the subjects—though to many of them it would more probably be known as a bib—and the word is strong-sounding and satisfying to the ear. 'Saxophone' also is a satisfying word; the instrument is familiar and, to the children, attractive. It is more difficult to account for the strongly marked preference of 'elephant' to 'kangaroo'; in sound, the word 'kangaroo' probably is more satisfying to a majority of people. Those of the children who had seen an elephant were more numerous than those who had seen a kangaroo; the Elephant House in Patrick Street is one of the Cork landmarks. On the other hand, all the children had certainly heard of a kangaroo and had seen pictures of it; they spoke of the animal afterwards with good-natured interest.

There is no apparent reason for the children's failure to remember the word 'daffodil'; the sound of the word is unemphatic and inconsequential, but the daffodil is a familiar and noticeable flower and was, moreover, just beginning to appear at the time the test was made.

Varying memorability was even more surprising when found in connexion with numbers. It might have been thought that quantitative abstractions could have no personality for a child's mind, that all numbers would be equally interesting. It is difficult accordingly to account for the overwhelming preference evinced for 18. It would appear that the number was considered purely as an abstraction; when the children were questioned, it appeared that it had not been considered as part of a date or an address or a telephone or motor-car number or as a desirable age to which the child would attain in two or three years or as the smallest of the numbers which were presented. Nevertheless, in the children's eyes it presumably possessed attraction—one or two remarked that it was a nice number—and, demonstrably, it was memorable.

The existence and the causes of apparently inexplicable memorial preferences call for further investigation. The reasons why people remember what they remember and forget what they forget are closely bound up with the quality of the original imprint which, in turn, is strongly influenced rather by the temperament, interests and attitude of the subject than by the vividness of visual or auditory stimuli. As Bartlett<sup>(3)</sup> remarks:

...To perceive anything is one of the simplest and most immediate as it is one of the most fundamental of all human cognitive reactions. Yet obviously, in a psychological sense, it is exceedingly complex and this is widely recognized. Inextricably mingled with it are imaging, valuing and those beginnings of judging which are involved in the response to plan, order of arrangement and construction of presented material. It is directed by interest and by feeling, and may be dominated by certain crucial features of the objects and scenes dealt with. In all these respects it may profoundly influence remembering, of which it is legitimately regarded as the psychological starting-point.

We come back once more to meaning; the imprinting is largely influenced by 'certain crucial features' as regards what the percept *means* to the subject.

On being questioned, the children themselves (all completely untrained in introspection) failed entirely to account for their memorial preferences. They could only say: 'You

couldn't forget an apple; you'd remember that easy' or 'You'd never think of a penny'. Incidentally the penny was a means to an end; the apple emphatically an end in itself. Reasons given for remembering and forgetting words or numbers were equally unsatisfactory. One class of girls, describing to a teacher the experiment in remembering numbers, said subsequently that they had been told to write down 'an awful string of numbers'. When they were asked 'what numbers?' they confessed that they had forgotten them all except 18. A class of boys, on being asked why they had not remembered 'calendar' could only say that they never thought of it.

## VII. SUMMARY

In January 1947 an experiment on Immediate Recall was carried out in six secondary schools of Cork City. The subjects (106 boys and 117 girls) who were between 14 and 16 years old were unselected.

The test was divided into: (a) observational noting of common objects; (b) word memory; (c) number memory. The objects to be remembered were shown to the children, the words and numbers were presented verbally. The children were asked to write down as many of the items as they remembered immediately afterwards.

It appeared from the experiment that, while girls surpassed boys in observational noting and in word memory, boys were better than girls at remembering numbers. Strongly marked variations in different aspects of power of recall appeared constantly, as did strong memorial preferences for certain objects, certain words and certain numbers.

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## CRITICAL NOTICE

By J. A. HADFIELD

*Christianity and Fear.* By OSCAR PFISTER. London: Allen and Unwin. 1949. Pp. 589. 30s. net.

This is an outstanding book dealing with the problem of religion, and Christianity in particular, in relation to the neuroses. Indeed the book might have been entitled 'Christianity as a therapeutic force for the prevention and cure of the neuroses'.

The author was a protestant pastor in Zurich, but became discontented with Christianity as usually presented, namely as a system of dogmas, and bases his thesis on the Christian doctrine of love, which is the essence of Christianity and 'constitutes the Founder's sole commandment'. Since the basis of most neurosis is anxiety and fear, love, which gives the sense of security, pardon for sins and a new motive for living, is a therapeutic force for the cure of these ills. If it is objected that Christianity has fostered rather than alleviated fear by its preaching of Hell and condemnation, Pfister would certainly agree; he holds no brief for spurious forms of Christianity. If it is maintained that the Christian Church has at times been brutal and has persecuted, he replies that it is because Christianity has departed from the doctrine of love as laid down by its Founder.

Unlike so many others whose psychologies of religion merely set out to use psychology to bolster up their particular view of religion, Pfister, on the contrary, finds that there is a 'monstrous volume of anti-Christianity in the history of Christianity' (p. 9) both in the Catholic and Protestant Churches. Indeed, he appears to be more critical of Christian dogma than of psychological teaching. He regards many of the dogmas of Theology as themselves neurotic manifestations and as having 'in fact arisen in conformity with laws governing the growth of neurosis'. So-called dogmas may be so pressed upon the believers that they themselves become a compulsion. Pfister's experience corresponds very closely to that of the writer of this review, who having taken a three-year course in Theology found that in its insistence on dogma it ignores the facts of human life and experience, and is too detached from everyday life to be of adequate service to man in his struggles with moral problems and neurotic disorders. Theological students are taught the doctrines, and given the message to preach, but are taught little or nothing of the human soul, of the nature of the soil into which the seed is to be sown. 'At first', says Pfister, 'I was devoted to theology and philosophy in their traditional if other-worldly forms... and later when I entered the Ministry I found myself confronted with spiritual and social sufferings of such gravity that I broke off my studies and devoted myself entirely to the immediate struggle with those religious and ethical distresses.' This, however (p. 32), does not mean that religion itself is a psychopathological phenomenon, nor does Pfister hold that view. Though a follower of Freud, Pfister does not agree with the latter in regarding religion as an illusion. His criticism of religious systems and dogmas does not 'constitute a threat to genuine religious values', nor are 'grace and love made to appear as illusions and reduced to terms of human error'. Indeed 'our task is to protect Christianity from the morbid malformation of fear' (p. 33).

Guilt is a subject which is the concern both of the moralist and of the psychopathologist, the former as consciousness of sin, the latter in the obsessions and propitiatory acts. This problem of guilt, the most common cause of neurotic fear, is not one, he says, which can adequately be solved except by those who have some knowledge of ethical values: for the abolition of moral values and yielding to the impulses of the ego is no solution.

There are various ways of dealing with the fear that arises from a sense of guilt (pp. 115-16). One is to side with conscience and accept its demands. Another is by the modification of conscience in its judicial rôle and threats. In other cases a compromise is maintained, the judicial authority is satisfied, with a symbolic settlement as by a sacrificial victim, whether an animal as in the Old Testament, or in the person of Jesus in the priestly conception of his function as set out by St Paul and others. The whole problem arises from the difficulty of establishing love and forgiveness without recompense for sin. To say it does not matter, is weak; it looks too lightly on sin, and encourages wrong. But in Christian teaching God is conceived as having through his love sent his Son as a propitiation to satisfy His own righteousness. People deserve punishment and God like a judge has to give it, but he does not want to give it because he loves his people. Therefore he is satisfied with a sacrifice instead, and further shows His love by Himself making the sacrifice (John iii. 17).

The neurotic tries to solve the problem of guilt by the simple device of denying it and repressing it, as in the case of Lady Macbeth and many of our patients. This attempt to evade guilt by repressing it leads to handwashing and other propitiatory obsessions including many religious rituals. Christian teaching, on the other hand, falls in line with psychological practice in that it insists upon the *acceptance* of guilt, and leads the obsessional (and the sinner) to face up to the issue, not to evade it. By so doing it undoes the mechanism which produces the obsessional symptom. Those who have regarded Christianity as a form of escapism, or itself a neurosis, have ignored this aspect of its teaching and practice.

But that is only the negative side of its teaching. 'The way to health and happiness consists not in weakening the conscience but in purifying it by love.' It is this new life motivated by love, and not a series of propitiatory acts, religious or otherwise, intended to appease an angry deity, which constitutes the teaching of Christianity and which provides freedom from the sense of guilt and a new orientation to health and happiness. The child becomes 'good' not only from fear of punishment, but willingly and freely because of love of its mother with whom it identifies itself: this is a positive desire to be good without compulsion. So the doctrine of love, by the process of transference (p. 515), and of identification with Christ, provides a motive for living a new life. *Christian repentance* (p. 200) is not like that of John the Baptist, which demanded repentance in view of some threat of oncoming disaster, but a turning away from the past because of the gladsome news of the reign of love and peace. The joyous acceptance of this new life makes a vicarious atonement unnecessary—it is no longer necessary to appease a God of Love; and it is no longer necessary to prove one's remorse, since the new life of love makes that unnecessary and spurious.

Pfister recognizes that there were threats of condemnation in the teaching of Jesus which were conducive to fear and therefore presumably to neurosis. He was particularly angry with hypocrisy which pretends righteousness whilst sinning by anti-social conduct, devouring widows' houses etc. But these threats 'are no more than well-intentioned warnings designed to protect men against leaving the path of salvation and to invite them to reverence God'.

The injunction of Jesus that we should *forgive* is also a therapeutic measure of the greatest importance when we realize how much neurosis is caused by repressed but persisting hate.

The problem of *conscience* and of the *super-ego* is one which is of the greatest significance to both moralist and psychopathologist. The super-ego, as every psychologist knows, can be the immediate cause of neurosis, in the excessive demands it makes upon the victim. The morbid conscience compels the individual to moral life by fear—it gives rise to the obsessions. Pfister points out how Christianity faces this problem (p. 215): 'Regarded psychologically and hygienically, the historic importance of the work of Jesus consisted in the fact that he *displaced conscience*, a strict authority promoting the formation of fear and of compulsion, in favour of love. . . (p. 216). He was in a position to substitute the simple commandment of love for the earlier compulsions—neurotic hairsplittings (of the law) . . . As in the case of analytic therapy, fear is cured through the settlement of guilt without expiation or atonement.' The rule of love being substituted for the rule of law and the 'must' gets rid of the super-ego, the main stumbling block in the neuroses. The super-ego which forces the repression of self-impulses by fear creates a situation which produces the neuroses. In love there is no 'must', no condemnation by fear, no repression and therefore no neurosis. Love, by getting rid of fear, gets rid of repression and therefore of neurosis. We pass then from the juridic teaching of the Old Testament to the therapeutic teaching of the New. Christ often spoke of himself as a 'healer', but he cured the sick not by magical words but by the inculcation of love which casts out fear and therefore abolishes the neuroses.

Pfister's approach is thus definitely analytic. He says, for instance (p. 111), that it would be a mistake for the medical man merely to eliminate fear, for fear often disguises a moral problem involving guilt, and the person is not cured till this underlying moral problem is discovered and solved by love. This is reminiscent of Ferenczi, who said that the patient is cured by the love of the physician.

This only touches the fringe of the vast mass of material which Pfister has brought forward. His historical chapters on Judaism, Christian religion, on the historic Jesus, St Paul, Catholicism, Luther, Zwingli and Calvin can only be mentioned. But to the social psychologist special mention may be made of his section on Fear as a problem of collective psychology in which he discusses not only what forms crowds, and crowd neurosis, but also the significance of the leader; and also (what is perhaps of more importance in these days!) how the leader can be got rid of by the crowd. These chapters are worthy of careful study, apart altogether from the more religious aspects of the case.

In all, this book is the most serious attempt to grapple with the problem of religion and neurosis which we have read. In this attempt it goes far beyond James' *Varieties of Religious Experience*, which is purely descriptive.



## CRITICAL NOTICE

By R. W. PICKFORD

*The Trend of Scottish Intelligence.* By GODFREY H. THOMSON, *et al.* Published for the Scottish Council for Research in Education. London: University of London Press, Ltd. 1949. Pp. xxviii + 151. 7s. 6d. net.

The scientific study of continuous variations was started by Johannsen in 1900, and many important experiments have established the fundamental principles which are involved. Fortunately in 1950 we do not have to consider seriously an 'environmentalist' controversy, whether the variations of intelligence as measured in the population are due *either* to environmental *or* to genetic causes. The problems before us concern (a) the relative contributions of genetic and environmental influences, (b) the extent of their interaction, and (c) the manner in which they act and interact. The consideration of these influences and causes of variation of intelligence, as if they were separable, is itself based on what might be called a necessary scientific fiction, because no organism can live without an environment that is at least to some extent favourable to it, and none can exist without a genetic constitution of some kind, or its equivalent.

The environmental influences which may affect the development of an individual's intelligence must be highly complex. They can be split up for scientific purposes into various related groups. For instance, they might be divided into (a) nutritional—the quality of diet and its assimilation; (b) the effects of 'physiological' diseases, such as infections and glandular disturbances, not themselves hereditary in causation; (c) the effects of 'psychological' diseases, both psychotic and neurotic, except in so far as they may also be partially hereditary in basis; (d) social factors, involving encouragement or inhibition by conditions of early upbringing, school, work, and also forms of specific training and the influences of the established social patterns in all sorts of elaborate ways, such as the possible social convention that girls cannot think as clearly as boys, or the differences in the sorts of toys used by children in different social groups. The complexity of all these environmental factors is so great that any attempt to classify and analyse them, though it must be made, is bound to seem artificial. It is also necessary to consider their interactions, which may be equally complicated.

The genetic influences are also highly complex, and we are in a position only to speculate about their number and diversity. All or any of the genetic factors which might affect the development and action of the sense organs, of the nervous system and brain, the ductless glands and the muscles, might in turn influence the intelligence we can measure. Doubtless the observed variations of intelligence in the population could be accounted for in theory on the assumption of a fairly small number of pairs of genes operating additively without dominance, and in studying the subject it is as well to have in mind the simplest possible scheme, and not to elaborate it except when definite evidence makes this necessary.

On the genetic side, we must probably suppose for a start that a group of polygenes are directly concerned with intelligence, while there are others which act indirectly by determining secondary conditions, such as glandular deficiencies, which in turn might affect the operation of the direct group. They provide its 'physiological environment'.

These points, and many others, form the background for the consideration of *The Trend of Scottish Intelligence*, which is a most important and valuable contribution to the problems of intelligence and its inheritance. This book reports a survey of intelligence test results for 70,805 children in Scotland who were aged 11 at mid-June in 1947, and compares them with the results of a similar survey of 87,498 children in 1932. In the intervening 15 years it has been predicted by Burt, Cattell and Thomson, that the average intelligence of a population such as that of Scotland might decline owing to the differential birth-rate tending to favour lower intelligence groups, and the negative correlation between intelligence and family size. A similar prediction was made elsewhere for similar reasons in respect of stature, and was not supported by direct observation. It is therefore not surprising to find that the comparison between the results of the group tests of the 1932 and the 1947 samples of Scottish children shows a significant increase rather than the predicted decrease, although the 1947 survey still shows a negative correlation between family size and intelligence. The comparison between the intelligence quotients of more than 1000 children tested individually, who formed a representative sample in 1947, and a similar sample tested individually in 1932, showed no change on the average. The difficulties of comparing the Stanford I.Q.'s of 1932 with the Terman-Merrill I.Q.'s of 1947 were considerable, but were effectively surmounted.

Many other points are dealt with, and a very large amount of important sociological material was collected; this will be analysed and published in subsequent books, and will be of the greatest value to psychologists and sociologists.

Indeed, one can hardly overestimate the interest and importance of surveys such as these. Everybody, the world over, who is dealing in any way with such matters as the distribution of variations of intelligence and their inheritance, must buy this book and read it carefully. Eight authors have contributed to it: Prof. Sir G. H. Thomson, Dr R. R. Rusk, Dr D. M. McIntosh, Dr J. M. Young, Mr D. Kennedy-Fraser, Mr J. Maxwell, Dr J. A. Fraser Roberts and Prof. D. V. Glass. Prof. Thomson, in a most admirable *Preface*, explains the circumstances under which the work was done, makes due acknowledgements to those who have helped and sponsored the 1947 survey, and discusses the significance of the conclusions with great lucidity. Prof. Glass, in a final chapter, considers the sociological and other implications of the work and reviews its more general points of interest for psychology and the social sciences. The other eight chapters are concerned mainly with technical descriptions and detailed analyses of the different parts and aspects of the work, each section by the man who carried out the research in question. The whole book is a model of clear and unprejudiced exposition and of sympathetically co-ordinated team-work.

Technical details, which are so clearly dealt with in the book, do not need to be examined in a review such as this. It is, however, necessary to rebut emphatically the criticism made by some people, even by serious geneticists, that measurements of intelligence are not suitable material for genetic studies, because they do not correspond, so it is said, to 'real' quantities. Intelligence is certainly both composite in nature and variable with the circumstances under which measurements are made. Stature is also composite in nature, one man's height being increased especially by the length of his legs, and another's reduced particularly by his short neck. Just as a child's measured intelligence may vary slightly with his emotional state, temporary mood, or attitude to the tester, so may a man's stature vary with the number of whiskeys he has taken or the length of time since his wife had twins. Like the mind, the body is a flexible system easily influenced by many factors. Intelligence measurements, moreover, made according to the well-known principles of 'mental' measurement, are not different in kind from physical measurement, which could easily be made by the same principles if convenient. In so far as intelligence can be represented quantitatively at all, it is just as suitable for biological study as any other kind of measurement made upon organisms, and as appropriate for genetics, provided the relative contributions of heredity and environment and of their interaction are considered.

Prof. Thomson points out a number of possible reasons why there was a rise in the average intelligence of Scottish children between 1932 and 1947. It might be due to test-sophistication (not affecting intelligence itself); to the possibility that the differential birth-rate favours the lower intelligence groups less than formerly; to the possibility that later-born children in a family might tend to be less bright. It might be due to purely environmental factors, which he does not mention specifically, such as the distribution of milk in schools, and it is even possible that the advantages from the evacuation of many children during war-time outweighed the disadvantages for the development of intelligence. Loss of 'negative' genes at the lowest intelligence levels, owing to infertility (or loss at any level owing to miscarriages?), may be as great as or greater than the loss of 'positive' genes at the higher levels owing to the differential birth-rate. Another possible cause of the rise, even in taking a sample of 70,805 children of the same age in a population of 5,138,700 and comparing with a similar sample taken 15 years before, might be due merely to the re-assortment of genes determining intelligence, and on this account a small decrease might be insignificant.

Because of all these imponderable influences, much more study will have to be done, especially in the direction of splitting up the population into subdivisions on the basis of measured intelligence, and these again in terms of environment. Then changes, if any, in the average intelligence level and its distribution for each of the subgroups might be observed in the offspring of those now tested, and be considered in relation to environmental influences. The formidable task of carrying out surveys, planned in this manner, over three generations, would not be beyond the powers of the Scottish Council for Research in Education, which has made a magnificent start.



## CRITICAL NOTICE

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*The Concept of Mind.* By GILBERT RYLE. London: Hutchinson's University Library. 1949. Pp. vi + 328. 12s. 6d. net.

This is a 'must' book for all psychologists. Prof. Ryle, Waynflete Professor of Metaphysical Philosophy at Oxford, and editor of *Mind*, has produced a welcome and important work that should be read by psychologists and all interested in psychological theory. It is welcome because a work of this sort is so long overdue. In recent years students and puzzled psychologists have been obliged to rely for clarification on books like Broad's *The Mind and its Place in Nature*—books that either do not appreciate contemporary work in psychology, or else use an outmoded method of dealing with all philosophical questions. Ryle's book will change that. As he points out by implication in his last chapter, the methodological programme of Behaviourism has been one of the main sources of his work; and his philosophical method is decidedly post-Wittgenstein. It is an important book because of the crucial problem with which it is concerned and the striking answer it provides. Roughly, the problem is that involved in the widespread view that a human being has both a body and a mind; and his answer is that this view is a myth. The power of the book arises largely from the fact that it tries to show in detail just why it is mythical to suppose that I have a body and a mind, and how it is that we ever come to make such a gigantic howler.

There are, however, at least two things likely to prevent psychologists from appreciating the relevance of the book, as well as its *genuine* limitations. The first is Ryle's method of dealing with the problem, or the form of his philosophical argument. His method of 'linguistic analysis' is likely to mystify all who are unfamiliar with recent philosophical work. The second and not unrelated difficulty is the fact that Ryle, on his own admission, pays very little attention to the concepts, discoveries and work of contemporary psychology. This will make it difficult, perhaps, for psychologists to relate Ryle's treatment of this problem to their own particular difficulties about it. Consequently, the book may strike some of them as quite unhelpful—an escapist excursion into the land of verbiage. In fact, Ryle's book has much greater relevance than his exposition may lead some of them to suppose.

Let me begin, then, by saying something about the philosophical method Ryle uses. Suppose I adopt a traditional view and argue like this. 'You cannot observe my sensations. You can affect them no doubt, particularly if you are a dentist. You can make reasonable guesses about the sensations I am having, etc. But only I can observe them. So obviously there are sorts of events—publicly observable events in the physical world, and the privately observable events in the mental world of each one of us.' Ryle replies to this contention in the following way. It is quite correct that the dentist cannot observe, or witness, my sensations. But this is not because 'some Iron Curtain prevents them from being witnessed by anyone save myself, but that they are not the sorts of things of which it makes sense to say that they are witnessed or unwitnessed at all, even by me. I feel or have the tweaks, but I do not discover or peer at them; they are not things that I find out about by watching them, listening to them, or savouring them. In the sense in which a person may be said to have had a robin under observation, it would be nonsense to say that he has had a twinge under observation' (p. 205). Furthermore, whereas we all know what it is like to have and to need observational aids, like stethoscopes, 'we cannot think what it would be like to apply such instruments to our sensations'. Whereas we all know what sorts of things impair or prevent our observation of common objects, e.g. fogs, singings in the ears, 'we cannot think of analogous impediments getting between us and such sensations as tingles and singings in the ears'. So sensations are not the sorts of things that can be observed at all. But of course they are not unobservable in the sorts of ways that flying bullets or planets to the blind are unobservable. They are unobservable in the sort of way that the letters of the alphabet are unspellable. Just as it is not proper to say of a letter that it is easy or hard to spell, so it is not proper to say of a sensation that it is, or is not, observable. Consequently, this traditional argument I produced fails to establish that there are two sorts of observable events, the one in the physical and the other in the mental world.

What is Ryle doing here? How does this philosophical sleight of hand work? The chief thing Ryle does is to go to what he takes to be the correct use of the word 'observe' in ordinary English, and, with great acuteness, to point out how we do and would use it correctly. The argument consists in pointing out that to say 'I observe my sensations' is to break the rules of correct speech. For when I say correctly

'I am observing *X*', my statement entails or is consistent with the statements 'I discovered *X*', 'I am peering at *X*', 'I am watching (or listening to) *X*', 'I find that so and so is hindering my observation of *X*'. But when I say 'I am observing a sensation', there are no such parallel statements entailed by or consistent with this statement. That is why it is 'nonsense' to say, for example, 'I have a twinge under observation'. Alternatively, we can describe what Ryle is doing like this. Suppose I say 'I am observing a sensation'. Then, if I am using the word 'observing' correctly, this statement will entail that 'I am watching (or listening to, etc.) a sensation' and that 'I can be aided or hindered (as mentioned above) in my observation of a sensation', etc. But these logical consequences are absurd in this case. Consequently, the original statement ('I am observing a sensation') is nonsense. This is the negative aspect of Ryle's performance here. But it is essential to notice that his performance is not only destructive. When he points out how it is nonsense to talk about 'observing a sensation' he draws our attention to some of the ways in which we do normally use the word 'observe' and the word 'sensation'. In particular, he shows us how the word 'sensation' functions quite differently from event words, like 'heart beat' and 'reflex movement', in that we can observe a heart beat but not a sensation. A sensation, therefore, is not an event. So the concept of 'a reflex movement' is of quite a different logical type, or category (using Ryle's terms) from the concept of a sensation. To suppose that a sensation is an observable something is to make a category mistake. So in carrying out his destructive purpose, Ryle is at the same time exhibiting 'the set of ways in which it is logically legitimate to operate' with a concept. In doing this he is pointing out the logical type or category to which the concept belongs.

But no concept stands alone. The words 'observation' and 'sensation' are also used along with other words like 'notice', 'recognize', 'feeling' and 'emotion'. To elucidate fully the ways in which it is legitimate to operate with the concept of 'sensation', it will be necessary to show how the correct and normal use of 'sensation' is related to the correct and normal use of, for example, 'noticing', 'seeing', 'feeling' and so on. But to do this is to do something very like charting the logical geography of all these related concepts. What Ryle is doing in *The Concept of Mind* is to chart in this way our concepts of 'mental powers and operations'. It is in this, still unusual sense that he provides us with 'a theory' of the Mind. Clearly he does not seek to deny any accepted matters of fact about minds. It may look as if he is doing so when, for example, he denies that sensations are observable. But obviously he is not, since it still remains quite correct to say in ordinary speech that 'I can notice twinges, feel pains' and so on. What he does here serves to draw our attention to the difference between being able to *use* the concept of sensation, and being able to *describe* our use of it. While I might be able to do the former perfectly, I might not be able to do the latter at all. So that when I try to describe our use of the concept, all I succeed in doing is to misdescribe this use in inappropriate and misleading idioms. Consequently, if some of our current descriptions of 'mental' concepts are inappropriate, Ryle's 'theory' of the mind will disallow them and indicate how we should talk about them instead.

Now the chief problem with which Ryle is concerned is this. There is current among psychologists, philosophers and laymen a certain set of descriptions of our 'mental' concepts. This set of descriptions stems chiefly from Descartes and is so prevalent as to merit being called the Official Doctrine or Theory. Let me recall, in Ryle-like terms, some of the essentials of this doctrine. Every human being has both a body and a mind. The bodies and bodily processes are in space, are publicly observable, and are subject to the mechanical laws governing all other bodies in space. Minds, however, are not in space, their operations are not subject to mechanical laws, and the workings of one mind are not observable by another. 'Only I can take direct cognisance of the states and processes of my own mind'; and over at least some of these episodes from my private history I have an 'unchallengeable cognisance' by means of consciousness, self-consciousness and introspection. The world, therefore, contains two sorts of events—material and mental, or those belonging to the outer world and those belonging to the inner. This two-world doctrine—it is well known—has produced the problem of how a person's mind and body influence one another. On this view 'the actual transactions between the episodes of the private history and those of the public history remain mysterious, since by definition they can belong to neither series. They could not be reported among the happenings described in a person's autobiography of his inner life, but neither could they be reported among those described in someone else's biography of that person's overt career. They can be inspected neither by introspection nor by laboratory experiment. They are theoretical shuttlecocks which are forever being banded from the physiologist back to the psychologist and from the psychologist back to the physiologist' (pp. 12–13).

Ryle says that he hopes to prove that this two-world, or double-life, doctrine is entirely false. A person is not a ghost mysteriously ensconced in the bodily machine. This doctrine is false, not merely in principle but also in detail. It is false in principle because it embodies one big category mistake. It is false in detail because it embodies a family of category mistakes (like the one about 'observing a sensation'). The one



big category mistake is this. When Descartes accepted the view that mechanical theory applied to all bodies in space, he could not accept the consequence that human beings only differed in degree from moving bodies. The solution he adopted was to suppose that minds were different sorts of things from bodies, and subject to causal laws, but fortunately not mechanical ones. In other words, just 'as the human body is a complex organized unit, so the human mind must be another complex organized unit, though one made of a different sort of stuff and with a different structure'. Just as the human body was a centre of mechanical causal processes so the human mind was the centre of para-mechanical causal processes. Clearly on this view the human body is like a machine governed by another ghostly machine inside it. Now the category mistake consists quite simply in assimilating minds to things—in supposing that just as bodies are one sort of thing, minds are another sort of thing. And consequently mental conduct words are construed as also standing for processes, but processes of a peculiar sort, viz. mental ones. All this is just a huge howler. A mind is not a different sort of thing from a body, it is not a sort of thing at all. It is not a complex organized unit—a centre of causal processes, an internal theatre where the private events making up my stream of consciousness are supposed to occur. It is quite true that I have a body. It is also quite true that I have a mind. But it is senseless to *conjoin* these two sentences and say 'I have a mind and a body'. For the two concepts of mind and body are of different logical type. Presumably if we were generally aware of this difference, it would be as much of a joke to say 'I have a body and a mind' as it was for Shaw to say, on leaving South Africa: 'I return with my heart full of gratitude and my stomach full of peaches.' Hence the traditional two-world theory is a myth. For it is 'the presentation of facts belonging to one category in the idioms appropriate to another'. 'To explode a myth', Ryle says, 'is accordingly not to deny the facts but to re-allocate them. And this is what I am trying to do.'

This, then, is Ryle's programme. To carry it out, he has to work through the list of important mental concepts, point out how in each case the two-world doctrine has mis-allocated them and show how they should be allocated instead. So we find him working through, for example, knowing, understanding, feelings, inclinations, moods, noticing, attending, seeing and imagining. We also find him dealing with topics like consciousness and introspection, since these provide motives for the two-world theory, and help to explain how it is that we ever come to make such a howler.

I shall try to illustrate how he carries out his programme by considering briefly what is, I think, a typical example of his procedure. Consider moods. We say, for example, that a person is depressed or happy. Ryle points out that in saying this we are saying something 'fairly general'. We are not saying that he is doing one thing frequently or all the time. Obviously. Nor are we saying that he is having one unique feeling. For in a strict sense of 'feeling', he is not having a feeling at all. Feelings come and go, we feel them all over us or else in a particular part. But while he would normally say 'I keep on feeling a twinge of toothache' he would not normally say in the same sense 'I keep on feeling happy (or depressed)'. He would not normally just say 'I feel happy (or depressed)'. And though this looks like saying 'I feel a tingle', it is really quite different from it. 'Happy' does not stand for a feeling as 'tingle' does. For if a person feels a tingle, he has a tingle; and if he has a tingle, he feels it. Yet his feeling a tingle is no evidence for his having it. None of this holds for the supposed 'happy' feeling. To say 'I feel happy' is therefore like saying 'I feel ill', or 'He felt stupid', where the accusatives 'ill' and 'stupid' are obviously not the names of feelings. Nor is it any help to suppose that to say 'He is happy (or depressed)' is merely to say he has frequent or continuous tingles, etc. For we should not necessarily withdraw our statement 'He is happy' on discovering he has no such feelings. And we should not necessarily be satisfied that he was happy (or depressed) if he merely told us that he had these feelings frequently, since they might be symptoms of indigestion or intoxication. What then is the 'fairly general' thing we are saying about a person when we say that 'He is happy (or depressed)'? We are saying that he is 'in the frame of mind to say, do and feel a wide variety of loosely affiliated things'. So to say a person is depressed is to say that he is in the frame of mind to say and do very little, not to smile much if at all, to turn a deaf ear to all social pleasantries, to feel 'heavy' visceral feelings, and so on indefinitely. In this way, mood words are short-term tendency words—they serve to characterize and to monopolize the total 'set' of the person during a short term. The force of this account can be felt if we contrast it with McDougall's thesis: 'The mood is clearly an affective-conative fact of immediate experience.'<sup>1</sup> This thesis is obviously part of the two-world story that Ryle is out to refute.

This treatment of 'mood words' brings out one essential and recurrent feature of Ryle's procedure. If we are victims of the two-world theory, we are only too likely to think, as McDougall obviously did, that 'a mood' was a mental state, or else some condition made up of a series of mental events. In charting mood and feeling words, Ryle has to get rid of this traditional idea. He does so by showing us that 'mood'

<sup>1</sup> *An Outline of Psychology*, 3rd ed. ch. 13, p. 359.

words are dispositional words. To say that a man is happy is to say he is in a frame of mind to do, say or feel this, that. . . indefinitely. That is, he is ready to, or disposed to, do, say or feel this, that. . . indefinitely. Ryle does the same sort of thing, to mention other examples, for knowledge, understanding, strength of will, motives, and attention (which Ryle deals with under what he calls 'heed words'). Thus, knowing French is knowing how, *inter alia*, to talk or write French intelligently. Understanding the game of chess, for instance, is a part of knowing how to play it. Strength of will is 'a propensity the exercises of which consist in sticking to tasks'; and 'an effort of will' is 'a particular exercise of tenacity of purpose'. To say that 'You are attending to what you are reading' is to say something dispositional, *inter alia*, that you could tell me about it afterwards. But it is also to say something non-dispositional, or episodic, viz. that you are reading in a specific frame of mind which actually shows itself in the ways in which you go about it. This last example brings out that there are different sorts of dispositions and that their logic is quite complicated—facts that Ryle is at pains to emphasize. I think I am right in saying that his demonstration of how far our mental state and process words are really dispositional in character is a most surprising and important revelation. Here perhaps is the most valuable contribution the book has to offer, and a very salutary corrective it is to the overemphasis in the opposite direction made by the traditional theory.

But dispositions, by definition, have to manifest themselves in episodes or occurrences. As far as I can tell (and here a summary or two would have helped the reader), mental dispositions manifest themselves in the following ways: (i) overt episodes (e.g. laughing, talking, hitting etc.); (ii) covert episodes (e.g. muttering to myself, fancying myself climbing Everest, etc.). Images are not included, since, presumably, these are either the perception of, for example, coloured patches (in the case of after images) or not perceptions at all, as in the case of imagining or remembering, where all I do is to fancy myself doing or, for example, seeing something. So in both cases all we have is covert behaviour. As for organic sensations or feelings (e.g. pains, tickles and muscular strains), we noted earlier that they are not observable happenings or events at all. Hence when I say: 'I am feeling a twinge in my finger', I am not reporting some event in my private theatre. I am just telling you that I am feeling a tingle. Consequently, to feel an itch is a behaviour episode, which may be overt or covert. The episodes, therefore, in which our dispositions are manifested are not the ghostly events that the two-world theory supposes them to be. This, I think, is the bald gist of part of Ryle's treatment of the way in which dispositions are manifested. But I find this part of the argument difficult and I may have misunderstood it.

Well, what is the relevance of all this to contemporary psychology? Some readers of this *Journal* may be tempted to mutter *sotto voce*: 'Not much—because the book does not deal with the sorts of concepts in which we are interested and which cause us sleepless nights. Concepts like inhibition, functional localization, skill, repression, socialization, and so forth, either do not appear at all, or else appear in some crude popular form.' But such muttering is largely a mistake. For the philosophical problem with which Ryle is concerned has its source, like other philosophical difficulties, in our use of ordinary and not technical discourse. Thus, the source of Adrian's bewilderment over the body-mind relation<sup>1</sup> lies not in his use of technical terms, which is no doubt excellent, but in his use of ordinary English which is most unskilful. I think the general relevance of Ryle's work is to show that contemporary psychologists have been wiser than they knew. For in spite of qualms and criticism, they were quite justified to take the plunge and say that they were proposing to concentrate on conduct or behaviour. They were quite right to reject the psyche and to substitute the organism and the person as the subject-matter of their science. This book shows in detail why there is no need for them to have any feelings of anxiety about doing so. And the book undoubtedly does take us a long way, at the least, towards solving the body-mind question. Once we appreciate what Ryle is up to, we shall not be tempted so easily, if at all, to talk the curious parallelism of Stout, or to adopt the animism of McDougall, or to fall into the confusing language in which Spearman explains and expresses his principles of Noëgenesis. The book will also be helpful and acceptable to psychologists in more special ways. For example, in the treatment of intelligence as a skill; in the rejection of 'volitions'; in the analysis of introspection as a response to a response; in the remarks about sensation and perception which complement some of the things the Gestaltists have urged, and, of course, in the importance he assigns by implication to acquired dispositions, which fits in with the current emphasis on learning.

I shall now mention two of the doubts I have about the book.

(1) Does Ryle succeed in exorcizing the ghost? I think he does. No one after reading Ryle will feel any temptation to use the model of the invisible homunculus situated inside each one of us. But has he also exorcized 'mental events, states and processes' in the two-world sense, and so dealt with the body-mind question? I doubt it. Look, for example, at some of the words that Ryle himself uses in dealing with

<sup>1</sup> See *The Physical Background of Perception*.



this question. Though it is not proper (correct) to talk of 'observing our sensations', it is proper to talk of 'having them' and 'of noticing' and 'paying heed' to them. Though a mood is not 'a mental state', it is 'a frame of mind'. Though imagining is not 'seeing', it is 'fancying'. What states, acts and processes do these words ('having', 'noticing', 'fancying') refer to? Obviously, Ryle cannot mean them to refer to the same sorts of states, etc., as he proposes to exorcize. His object is not to call roses by other names. If, however, they are meant to refer to *different* sorts of states, etc., then what are these? Just behaviour readiesses, responses, and serial responses? Presumably yes—since Ryle wishes to exorcize mental events, etc. But then what is the difference between, say, the 'fancying' of a person, and the 'fancying' of the machine that Norbert Wiener hopes, no doubt, to design shortly? Ryle's view seems to entail the consequence that there is no difference between them, which is just false. This means that Ryle's treatment of the body-mind question is just not complete.

What has gone wrong here? Ryle has made the empirical assumption that the chief source of the trouble *at present* is the unconscious phantasy of the internal ghost; and this assumption is, I think, a mistake. It may have been true in the past, and it may even be so among many professional philosophers at the present time. But I doubt whether it is true among psychologists and among educated people in this country who have been relatively untainted by traditional epistemology. The more important source of the trouble lies in another phantasy that Ryle mentions and dismisses, far too cursorily, in a few pages (pp. 156 ff.). This is the idea that conscious states, events, and processes are by their very nature self luminous, or self intimating, or phosphorescent—that 'the mind can "see" or "look at" its own operations in the "light" given off by themselves'. I think it can be shown—though space forbids it here—that some such idea is at the back of difficulties like the one about robots. This defect in Ryle's treatment can be pointed out in a slightly different way. He is concerned to sweep away the lumber of queer mental acts and processes that traditional epistemology has bequeathed us (e.g. sensing, apprehending, willing). And how salutary this is—particularly for philosophers. But it is not sufficient—certainly not for psychologists. The reason is that the chief trouble centre to them is not round the queer mental acts of the epistemologist. Psychologists have long since ceased to bother about these. It is centred round words like 'recognition', 'thinking', 'remembering', 'seeing' and so on—in fact the very words from ordinary speech that Ryle uses, or would be prepared to use, to describe mental operations. One of the places where this trouble centre is manifesting itself just at the moment is over 'mechanical brains'. In what way, for example, would their scanning and coding (or seeing), their storing of resulting records (their capacity to remember), their comparison of records with previous records (or recognizing)—in what way would all these differ from the seeing and recognizing of human beings? Psychologists are tempted to answer this question by saying, for example, that: 'We are unlike machines because we are conscious beings, we experience things; the machines do not.' Because the book does not deal with this trouble centre, it is in this respect not particularly helpful to psychologists. To them Ryle's emphasis on dispositions may seem a little overdone because he does not deal with these important residual questions. What is required, therefore, to supplement Ryle's account is a full discussion of our use (a) of words like 'recognize', and (b) of words like 'conscious', 'awareness' and 'experience'—the first of which Ryle treats in a cavalier manner and the last two of which are not even indexed. That it is important for Ryle to deal with these notions is shown in the fact that, even where his case is very strong, viz. for 'knowing how', he has not dealt with the 'Aha!' experience. But how to deal with these words and topics in a way that *will* cope with the body-mind problem is another story.

(2) I have some doubts about the value of the philosophical method Ryle uses. As I pointed out, he goes to ordinary discourse to determine the logical type of a concept and so to correct any mis-allocation of it that may be current. Consider imagination. He says there are no objects of our imaginings because, for example, it is not correct to say 'a person can see vividly', but it is correct to say 'a person can picture vividly'. And he points out how we do normally distinguish between seeing trees, etc. and only 'seeing' in some other way the objects of recollection or the objects of a person in *delirium tremens*. We might say, for example: 'Oh, he does not really see the pink rats—he's only imagining them.' Considerations of this sort lead Ryle to say that seeing is 'totally different in kind' from seeing in imagination.

Now everything Ryle says about our use of ordinary discourse may be perfectly correct. But does it provide a *sufficient* reason for distinguishing 'seeing' and 'seeing in imagination' as different in kind? Obviously not. If Western communities had taken the distinctions embedded in ordinary discourse as gospel—in the way that Ryle appears to be doing here—modern science would never have developed. And it is not difficult to imagine psychologists constructing quite a good case for assimilating all the three sorts of imagery—after images, eidetic images (which Ryle does not appear to mention) and memory images, including those of imagination. It is not difficult to see how the work of Perky, the Marburg School, G. W. Allport (*Brit. J. Psychol.* 1924–5), Jacobson, and Gudmund Smith could be used for such

a purpose. Well, are we to condemn such a view as false from the very outset, just because ordinary speech does not allow us to assimilate these three types of imagery? Obviously not. So Ryle's analysis of ordinary speech here may be quite correct but it is not very relevant or interesting to those concerned to apply scientific method to the behaviour of organisms. His analysis needs to be supplemented, therefore, by an account of the relation between the use of mental conduct words in ordinary speech and their use in the technical literature. This conclusion is important because it suggests that we are reaching the stage where not much work on the mind can be done in future by philosophers who are not also steeped in psychology.

But there is a further difficulty. Even if philosophers concentrate on what ordinary discourse says about minds, and attempt to answer philosophical questions by charting this discourse, they run into the formidable objection that it is not the sort of thing that can be charted anyhow. If they attempt it, all they will achieve are different projections of it by unavoidably concentrating on certain idioms and ignoring others—just as philosophers produced different projections of 'facts' in the 'twenties and 'thirties by concentrating on different features of the 'facts'. They will then find it difficult to produce any generally acceptable reason for adopting one projection rather than another—for talking, for example, about 'fancying' rather than about 'seeing an image in the mind's eye'. Traditional metaphysicians used to suppose that only one view of the world was ultimately correct or right, and that with hard work we could develop it. Similarly, it is the besetting illusion of grammatical positivism—which is the dominant fashion at the moment—to suppose that there is only one map of ordinary discourse that is ultimately correct or right, and that with hard work we can draw it. If we follow this road we run the risk of the same blind alley that we ran into in the 'thirties—only at a higher level this time, talking about 'words', instead of about 'facts'. If all this is so, then it follows that it is pointless for Ryle to say that he is going to *prove* that the two-world view is entirely false. For this view is not the sort of thing on which this operation can be performed. I predict that one of the ways 'mentalists' will object to the book is by picking on those idioms of ordinary discourse that he has ignored in his map-making. If any reader feels dissatisfied with the book, I suggest he tries his hand at this line of criticism. In the course of it he will come to appreciate the subtlety and richness of the analysis it contains—features that no remarks of mine, favourable or critical, can possibly convey.



## PUBLICATIONS RECENTLY RECEIVED

*The Social Problems of an Industrial Civilization.* By ELTON MAYO. London: Routledge and Kegan Paul. 1949. Pp. xvi + 160. 12s. 6d. net.

All students of industrial psychology will feel a sense of loss on reading of the death of Elton Mayo on 1 September 1949. He was originally attracted to medicine but became interested at an early stage in his career in the then little considered psychological aspect of medical work, so that it was almost inevitable that he should have studied the practical side of the war neuroses, which the war of 1914-18 brought to the fore. In 1923 he went to the United States of America, where he was for many years the senior professor in the Department of Industrial Research in the Harvard Business School, and with his colleagues was responsible for research which has been widely known and has influenced the point of view of many who did not know him. He was, in his writings, very generous in his appreciation of the work of others. His first book, published in 1933, *The Human Problems of an Industrial Civilisation*, was not only stimulating but practical. Its aim, like that of the Industrial Fatigue (Health) Research Board, was to study the importance of the human, as distinct from the technical, problems of industry.

In 1945 he published in America the *Social Problems of an Industrial Civilisation*, now available in an English edition. He lays it down as axiomatic that every social group, at whatever level of culture, must face two perpetual problems of administration, namely the satisfaction of material and economic needs and the maintenance of spontaneous co-operation throughout the organization. He contrasts what he calls the successful sciences, chemistry, physics, physiology, with the unsuccessful, sociology, psychology and political science. 'The so-called social sciences encourage students to talk endlessly about alleged social problems. They do not seem to equip students with a single social skill that is usable in ordinary human situations.' The emphasis is on *skill* as contrasted with *knowledge about*. Maturity demands a highly developed and continuously developing social skill. He illustrates this point of view by the failure of nations, and the various specialized groups within one nation, to understand one another. He thinks that if our social skills had developed as have our technical skills there would not have been the last war. He admits that the latter are easier to acquire than the former, but the unfortunate result is that the rapid development of the technical skills, unbalanced by equal development of the social skills, has led to social chaos and anarchy.

He is very critical of the theories expressed by economists, sociologists and psychologists who he thinks tend to ignore the facts, as opposed to the theories, of human organizations. Persons remote from the active world of affairs, such as academics, writers and lawyers, have a small degree of social skill and so tend to ignore the extreme importance of the facts of human organization for all those who would direct the work and thought of others.

As an illustration of his meaning he discusses the clinical approach to human problems, and here he returns to the Hawthorne Experiment and the morals that it emphasized. A chapter on Absenteeism and Labour Turnover again stresses that (a) any administration is dealing with well-knit human groups and not with a horde of individuals, (b) the belief that the behaviour of an individual within the factory can be predicted before employment by tests of his technical or other capacities is mistaken. In a chapter called 'Patriotism is not Enough', he returns to the problem that we have failed to find out how to live together in peace.

Many will not agree with some of his generalizations, but there is no doubt that the book is thoughtful, critical and provocative, and written in Elton Mayo's pleasant English style mercifully free from unnecessary abstract nouns.

MAY SMITH

*The Biology of Mental Defect.* By L. S. PENROSE. London: Sidgwick and Jackson, Ltd. 1949. Pp. xiv + 285. 21s. net.

During the last fifteen years considerable advances have been made in medical genetics; and these have furnished much new information bearing on the social significance of various forms of mental deficiency. Consequently, Prof. Penrose has felt it necessary to re-write his earlier book 'so that the problems can be properly related to the rest of sociology and medicine'. The result is an entirely new volume which should

be read and studied, not only by those engaged in work on the mentally handicapped, but also by every psychologist and sociologist.

The bulk of the chapters is concerned with principles of causation, and provides an up-to-date and authoritative account of 'methods of analysis in human genetics'. The inheritance of intelligence is discussed in detail, and there is a concise short chapter on the genetic background of mental disorders. As Prof. Penrose points out, the biological basis of mental deficiency is much more intricate than is commonly realized. Yet, in spite of the complexities which advancing knowledge has introduced, his survey is not only surprisingly thorough, but lucid and convincing.

It is hardly surprising that Prof. Penrose is inclined to criticize the current tendency to define mental deficiency in social terms. 'To the sociologist', he says, 'it may be an advantage to have a social criterion for defining a group; but to the biologist or psychiatrist such a definition is extremely unsatisfactory. . . . If mental defect is to be defined in terms of social incompetence, those incapable of maintaining themselves economically in a competitive society are by definition mentally defective. The inference that the same people would be incompetent in a different environment is unjustified.'

His references to the work of psychologists will not always command assent among psychologists themselves. Some of his criticisms are no doubt well-deserved. But occasionally the views that he attacks are not so much views put forward by psychologists themselves, as views commonly attributed to them by medical writers. This is particularly the case in his account of general intelligence, and of the methods of intelligence-testing used in diagnosing mental deficiency. 'To be precise', he says, 'we should speak only of the ability of each subject in each given test, and not of his intelligence level. . . . Intelligence as considered by Spearman is an abstraction like the idea of size. Intelligence tests only measure Spearman's "*g*" in the same way as a measurement of length, breadth, or girth might be used to measure an abstract quality which we might call size.' The concept of intelligence, however, is not really due to Spearman; and Spearman himself was especially anxious that intelligence should not be identified with what he called *g*. Nor did he undertake any investigations to show how far, if at all, his *g* was innate or inherited.

Prof. Penrose apparently accepts the view that 'the distribution of intelligence scores in the general population approximates to the normal or Gaussian form'. To show this he reproduces a diagram from Pearson's paper, published in 1931, based on tests applied by Jaederholm in Sweden; and adds that 'the work of Pearson thus provided concrete evidence for the views put forward by Galton that intelligence in the general population is distributed in a continuous Gaussian curve'. But the basis of the diagram is by no means clear as it stands. I find that more than one reader has supposed that the 27,065 normal persons represented were all directly tested, and that the frequency distribution obtained was as symmetrical as the figure indicates. I would suggest that a note might be inserted to point out that the distribution of the normal cases here shown is based merely on a theoretical construction. It is a little surprising that Prof. Penrose does not quote similar surveys carried out in this country, particularly as these have demonstrated that, in point of fact, the distribution of intelligence is not precisely normal, and that the deviations are fully significant statistically. The difference is of some importance because the proportions of defectives to be expected on the assumption of a normal curve—proportions used by Prof. Penrose in some of his arguments—differ appreciably from the proportions actually found.

These are points on which a psychological reviewer writing for psychologists naturally seizes; but Prof. Penrose is writing on the biology, not the psychology, of mental defect; and on biological issues every psychologist may accept him as at once an original and a trustworthy thinker. Prof. J. B. S. Haldane, who contributes a preface, states that he 'does not agree with every statement in the book'. But he acclaims it as 'not merely a textbook for specialists, but a contribution to thought and to humanism'. To that every reader will readily assent.

CYRIL BURT

#### INTERNATIONAL CONGRESS ON MENTAL HEALTH, LONDON, 1948

- Vol. I. *History, Development and Organization*. London: H. K. LEWIS. 1949. Pp. 154. 10s. net.
- Vol. II. *Proceedings of the International Conference on Child Psychiatry*. London: H. K. Lewis. 1949. Pp. xiii + 142. 10s. net.
- Vol. III. *Proceedings of the International Conference on Medical Psychotherapy*. London: H. K. Lewis. 1949. Pp. xv + 129. 10s. net.



Vol. iv. *Proceedings of the International Conference on Mental Hygiene*. London: H. K. Lewis. 1949. Pp. ix+330. 20s. net.

These four volumes containing the Proceedings of the International Congress on Mental Health held in London in August 1948 are remarkable for the amount of detail they contain. Volume I gives an account of the origin, aims, and organization of the Congress, including such items as the development of the programme, the countries, professions, and organizations represented, the languages used, notes of films shown, and much other information which will be valuable to those who may have to organize a conference on a similar scale. The remaining volumes are devoted to the Proceedings of the three Conferences comprising the Congress. The method of presentation is the same in each case: the theme of the Conference (e.g. 'Guilt') is introduced by appointed speakers, and their statements, together with those of contributors to the discussion, are given verbatim. This faithful report will be appreciated by those who were present, but other readers would have found it helpful if marginal notes had been added on the content of the respective contributions.

The Conference on Mental Hygiene was the largest, and its theme 'Mental Health and World Citizenship' (Vol. iv) is perhaps the most interesting of the quartet. Preparatory Commissions had done an immense amount of work, and their inquiries revealed the urgent necessity for the development of a sense of world citizenship. The Conference confirmed this finding, and took the very practical step of establishing the World Federation for Mental Health. Further suggestions to the same end involve the strengthening of such organizations as UNESCO, the World Health Organization, ILO, and the Food and Agriculture Organization. The theme of the conference on child psychiatry, reported in vol. II, was 'Personality Development in its Individual and Social Aspects with Special Reference to Aggression'. 'Guilt' was the theme of the conference on Medical Psychotherapy (vol. III).

S.B.N.S.

*The Retarded Child*. By HERTA LOEWY. London: Staples Press. 1949. Pp. ix+52. 3s. 6d. net.

Miss Loewy's own practice with individual backward children is no doubt a success, but this exposition of her methods lacks precision, and appears to take little note of the child as a whole entity. It is never made clear what exactly is meant by a 'retarded child': the term here seems to include low-grade defectives, physically handicapped and therefore educationally backward children, and the whole range between. The same methods are apparently applicable to them all, and there is no indication of the age, mental or chronological, to which the various educational stages are suited.

The behaviour aspect of teaching backward children is omitted, apparently on purpose, and there seems little appreciation of the fundamental necessity of fostering the child's interest and confidence. One almost wonders whether the principles behind the book are not those of the old 'faculty' psychologists.

A. M. SILVER

*Encyclopedia of Criminology*. Edited by V. C. BRANHAM and S. B. KUTASH. New York: Philosophical Library. 1949. Pp. ii+527. \$12.0 net.

This work which comprises some five hundred closely printed pages by no less than sixty-one contributors is, as the Editors say, an attempt to steer a middle course between detailed discussion and journalistic notation. It would appear to have been written essentially for workers in the United States of America and will be of some help to police officials and social and similar workers rather than to psychologists and psychiatrists.

Many of the sections inevitably suffer from over-condensation. The bibliographies provided after each article in many cases ignore British contributions to the literature. In an account of the history of behaviour clinics, it is observed that during the war years in England not only was the London clinic maintained, but other clinics were founded under appropriations by the English Parliament: surely this gives a false picture of developments in this country before World War II. Practically the only reference to research work outside the United States of America is the mention of the reports of the Institute for the Scientific Treatment of Delinquency in London.

The book suffers from having attempted to include too much within its compass. It is difficult, however, to see how it could be otherwise in a volume of this size which endeavours to deal with psychiatry, psychology, medicine, sociology, law, penology and history. It should prove of more assistance to the reader in the United States of America than in Great Britain.

J.D.W.P

*The Criminal and his Victim.* By HANS VON HENTIG. Yale University Press (London: Geoffrey Cumberlege). 1949. Pp. viii + 461. 32s. 6d. net.

The author brings almost everything into his net, and the result is that, though he discusses very fluently scores of physical, psychological and psychiatric aspects of the criminal, many of these are dealt with in much too facile a way. For example, he allots only four pages to intelligence while giving seven pages to red hair. In the chapter on mental disorders, he depends largely on Kraepelin not only for descriptive purposes but also for causal explanations, and much that he says is therefore out of date.

He believes with the Italian school that there is 'true moral imbecility', or 'constitutional immorality'. He is also of the opinion that intelligence quotients would appear much higher if assessed under the influence of cocaine. The reviewer finds the author's account of psychopathics disappointing and inadequate. For British definitions of mental deficiency, he refers to the Mental Deficiency Act of 1913, not that of 1927, and he quotes the old definition of 'moral defect'.

In dealing with the sociobiological elements of crime, he discusses protective and pseudo-protective groups; crises of transition, i.e. macro- and micro-migrations; occupation and crime; and religiosity and crime. These sections are worthy of careful study, and it is in this field that the author appears most at home.

The section on geophysics and crime is well tabulated, but his comments on the possible influence on human conduct of moonlight and the aurora borealis are unlikely to meet with much acceptance.

The real value of the book lies in the discussion of the role which the victim plays. This opens up a wide field calling for further inquiry and research. The author suggests that if more attention were paid to the crime-provocative function of the victim, the potentialities of crime prevention would be greatly increased.

In summary, much of this book is inadequate and tantalizing, but, like the curate's egg, it is good in parts.

J.D.W.P.

*The Family and Democratic Society.* By J. Kirk Folsom. London: Routledge & Kegan Paul. 1948. Pp. xi + 767. 30s. net.

Prof. Folsom's *The Family and Democratic Society* is virtually two books in one: a handbook of the sociology and psychology of the family and a discussion of the problems of democratizing the family. In this partnership the handbook has suffered less than its partner. An aggregation of topics is perhaps proper to handbooks. Discussion calls for more integrated treatment. Digressions for the sake of comprehensiveness are natural in a handbook, but slacken the tautness of discussion.

Half the book is devoted to laying the foundations. There is a description of family patterns in different cultures, a history of the family, especially in North America, a chapter on population problems and one on the effect of social changes upon the family. In fact, doubt begins to arise as to the wisdom of some of these foundation chapters. Some discussion and definition of personality is no doubt necessary in a book on democracy and the family. But is not the chapter of thirty-five pages devoted to this topic too long, too comprehensive, and too indefinite in outcome for such a purpose?

The second half of the book is chiefly concerned with the husband-wife relations, both before and after marriage. The other aspects of the family are less generously treated. There are six chapters on husband-wife relations to one on parent-child relations. There is none on relations between the children themselves.

The same limitation is clearly visible in the final chapter on Unsolved Problems. Two problems are singled out as the fundamental problems of democratizing the family: 'Just how can people find the mates who will assure monogamous, creative, enduring love in time to bear children in early adult years? Second, how can we harmonize the need for adult achievement and self realization, especially of women, with the needs of young children for that almost continuous attention which this development apparently requires?' (p. 662). Such a formulation even if tenable is strikingly adult-centred. How much it leaves out—the family problems of adolescence for example!

As a handbook and with the limitations noted, Prof. Folsom's book will be useful to many. As a discussion of the problems of democracy and the family it is too diffuse, too digressive and too sentimental to serve the purpose which the author had in mind and to fulfil the need which undoubtedly exists for an incisive, realistic, and fundamental discussion of the problems of democratizing the family.

H. E. O. JAMES



*Insight and Outlook.* By ARTHUR KOESTLER. 1949. London: Macmillan. Pp. xiv + 442. 25s.

The title of this book, and the publisher's claim that Mr Koestler is trying 'to do for philosophy what Einstein attempted for physics in his "unitary field theory"', are both against it. The first gives us no idea what the book is about, and the second is likely to put off psychologists, who are wearied of amateurish angels claiming to go further than they dare to tread, and who prefer the safer pursuits of factorial analysis and the minutiae of neural response. For those, however, who enjoy taking a flight now and then, Mr Koestler has much of interest to say. We know, after all, on other grounds that he is a very intelligent man and an engaging writer.

He starts with an analysis of the comic. This involves the conception of the 'operative field', a concept with which we are familiar. It is Mr Koestler's expression for the schematic system of associations which are responsible for trains of thought and memory. Mr Koestler is at pains to formulate some notion which frees him from any actual associated series, and yet allows him to refer to a controlling mechanism which is responsible for the relevance of various associated series which can be said to be 'about the same topic'. Now according to his theory the conditions of the comic are: (a) one 'operative field' interrupted by another ('bi-sociating', he calls it), and (b) a charge of self-assertion, aggression, or sexual emotion attaching to the first 'operative field', which explodes in laughter when its course is interrupted by the second: 'Operation successful—patient dead'. It may be, however, that our attitude is different. In a situation potentially comic because of 'bi-sociation' we may sympathize with the victim; the situation may appear tragic rather than comic. Self-assertion (in a very general sense) has been displaced by an attitude of sympathy, or, perhaps, merely of interest. When this occurs the two 'bisociating' fields are, as it were, integrated or synthesized.

These are Mr Koestler's tools: 'bi-sociation' and the pair of opposing attitudes, which are tentatively linked up with the opposition between the sympathetic and para-sympathetic branches of the autonomic nervous system. With these tools he develops two interconnected themes. In the first place he presents the two attitudes as instances of two opponent principles which operate throughout the whole biological and social world. They are the self-regarding principle in the cell and in the individual, and the integrative principle which orders cells into multicellular organisms and individuals into societies. The balance is not always kept, and disaster occurs when either principle gets out of hand. This is, of course, an old story, but Mr Koestler tells it persuasively and with illuminating details and additions. His second theme is concerned with the relation between the comic, art and scientific discovery. Here he brings in 'bi-sociation'. According to him, as we have seen, the comic presents itself when the 'bi-sociated' fields are charged with the self-assertive principle. The aesthetic experience, on the other hand, occurs when the self-transcending principle is at work, operating on 'bi-sociations' of, for example, situation, character or theme, presented in the 'bi-sociative' framework of the real versus the illusory. This is gone into in great detail, and among other things we are shown, as we might expect, that aesthetic rapture and the mystic experience are closely allied. Between these two extremes, where either self-transcendence or self-assertion is dominant, comes scientific discovery, where our onslaught on nature is balanced by our desire to know her. This is the merest outline of Mr Koestler's rich development of his topics—a development which is to be carried further in a second volume.

There are two matters which we may hope to see cleared up. The first is that Mr Koestler seems to disregard all the criticism which has made us look askance at Levy-Bruhl's theory about primitive mentality. This theory is grist to Mr Koestler's mill, because there surely, in the 'participation mystique', you have the self-transcending principle at full blast, but according to many observers savages think and experience very much as we do. This does not seriously undermine Mr Koestler's position, but the absence of any account of music is indeed startling. A 'bi-sociative' theory of literature, poetry, drama and even painting in the hands of a writer with Mr Koestler's ingenuity is comparatively easy, once the initial idea is there, but music would appear to be a more difficult proposition. However, no doubt in his second volume Mr Koestler will set our minds at rest.

W. J. H. SPROTT

*Frustration: the Study of Behavior without a Goal.* By NORMAN R. F. MAIER. New York, Toronto, London: McGraw Hill. 1949. Pp. xiv + 264. 21s. net.

The experimental work on which this book is based was concerned with the behaviour of animals that had been deliberately baffled in an experimental situation. It falls into the same field as previous work on experimentally induced neuroses and convulsions, the main reports of which Dr Maier summarizes.

He and his associates have studied chiefly the stereotypes and fixations of behaviour which can be set up in rats. The control groups of rats in his typical experiments were trained to discriminate between two cards marked with different symbols (one leading to reward, the other to punishment) in jumping from a platform. For the experimental groups the cards were made to lead inconsistently to reward or to punishment so that no dependable discrimination was possible; but the rat was still forced (by a jet of compressed air) to go on making the jump. This was held to be a 'frustrating' situation, and comparisons were made between the behaviour of these rats and those trained to discriminate. The baffled animals were found to adopt and maintain a consistent stereotyped preference for one or other card, although it gave no advantage in terms of reward and punishment. When they were later given a chance of learning to discriminate, with consistent reward and punishment, 71 % of them were found to be so 'fixated' in their previous stereotype that they failed to overcome it in 200 trials. Control experiments showed that only 26 % of the normally trained rats failed to change from one consistently rewarded response to a different one. Thus the baffled animals' stereotypes (which had been punished as often as rewarded) were *more* stable than responses established in the other animals by consistent reward. Many variants of the experimental work extended and checked these central findings.

From these facts Dr Maier argues against the common assumptions that all behaviour is directed towards a goal, and that the satisfactory outcome of an action facilitates its repetition, whereas a disagreeable outcome acts as a deterrent. In particular he is easily able to show that much neurotic behaviour (including neurotically induced delinquency) does not respond in the expected way to reward and punishment. The orthodox expedient of psychotherapists is then to postulate an unconscious goal which is directing behaviour (to say, for instance, that the enuretic child unconsciously wants to annoy its mother or be a baby again). Dr Maier believes that this kind of speculative explanation, besides being too temptingly easy, is unnecessary. Instead he suggests that we should recognize a broad category of behaviour that arises immediately from frustration and is not directed towards a goal: this frustration-induced behaviour may include forms of regression, aggression, resignation (or apathy), behaviour fixations, neurotic symptoms (compulsions, etc.), and perhaps anxiety. He regards such behaviour as unadaptive, not in the sense of its failing to reach a goal or being aimed at an ultimately undesirable goal, but on account of its having no goal. The occurrence of one bit of behaviour rather than another in these circumstances he attributes to its 'availability', in terms of past experiences, physical peculiarities, accidents of the present situation, social influences, etc.

Dr Maier perhaps makes too much of the contrast between his views and more usual accounts of motivation. For instance, he probably overstates the extent to which the baffled rats' behaviour was without a goal. He takes the view that they were not goal-directed because the choice of card at which to jump was apparently made without anticipation of reward or punishment. It seems equally true to say that the main feature of the behaviour, the jump, was directed to the goal of escaping from the blast of compressed air; only a subordinate feature, the direction of the jump, became fixated in a way that bore no relation to a goal.

Similarly, in his theoretical discussion, Dr Maier is inclined to make his view sound more completely new than it is. In discussing neurotic fixations of behaviour he could have made more of the possibility that behaviour originating as a mere breakdown phenomenon (induced by frustration and not goal-directed) might be reinforced by the secondary gains that it brought, and therefore be partly frustration-induced and partly goal-directed. Again, the discussion of aggression would have gained by including some reference to the display of anger as a form of 'emotional expression', for in treating this topic even the ordinary text-book implicitly goes outside the notion that all behaviour is, in a simple sense, goal-directed. A full consideration of these and similar facts might permit rather more dove-tailing of the new facts to the old theories than Dr Maier supposes possible.

Some revision also seems needed in the definition of frustration. Frustration is defined as 'the process whereby the selection of behaviour is determined by forces other than goals or mere neural connexions'. But Dr Maier's thesis is that frustration produces just this 'unmotivated' behaviour. The thesis that was to be argued has been incorporated into the definition. This tautology allows Dr Maier to say that those 26 % of the normally trained rats that fixated their response had apparently been unintentionally frustrated by the demand for a new response. The observed facts, however, are (a) that some rats in both the control and the experimental groups became rigid in their responses, and (b) that the proportion was higher among those that Dr Maier tried to frustrate. It remains a logical possibility that some frustrated rats did not 'fixate' and that some unfrustrated rats did 'fixate'. The question-begging definition of frustration in terms of fixation can settle nothing.

However, this difficulty is far from invalidating the main argument of the book. There can be no doubt that most psychologists have been apt to assume that all behaviour is directed to a goal and that reward



will act as an encouragement and punishment as a deterrent; and they have assumed that these principles held good for men and rats. Dr Maier shows that they are not true for rats, and he argues convincingly that they are untrue for men. His work encourages us to make more use of the notion that some behaviour is best understood as a purposeless result of being outfaced in the effort to adapt ourselves to an over-difficult situation. Although much of the book, and especially the rather commonplace discussion of children's behaviour disorders, could well have been pruned, it is still a challenging and valuable book. It should certainly provide a starting-point for further work in its illuminating discussion of the relations that exist among conflict, rigidity of behaviour and punishment.

D.W.H.

*The Thought and Character of William James; Briefer Version.* BY RALPH BARTON PERRY. Harvard University Press (London: Geoffrey Cumberlege). 1948. Pp. x + 402. 32s. 6d. net.

Prof. Perry's monumental 1600-page book *The Thought and Character of William James*, which won the Pulitzer Prize in 1935, is here presented in a shortened version, rather more than a quarter of the length of the original. The abridgement is primarily of the 'scissors and paste' type, but there has been considerable re-arrangement and a certain amount of re-writing, and some new material has been added, including three recently-discovered letters. The cuts have been made mainly in the more technical sections; the biographical material—which is profoundly interesting both for its own sake and the light it throws on James's philosophical development—has been largely retained, likewise the copious extracts from James's letters and diaries. In its shortened form, the book will appeal to the intelligent general reader as well as to the professional psychologist and philosopher. It may well rank as one of the great biographies of the century.

*Educational Psychology, Its Development and Present Status.* By G. M. BLAIR. University of Illinois Bulletin, 1948, Vol. 46, No. 13. Pp. 34. Bureau of Research and Service, College of Education, Urbana, Illinois.

The title of this short Bulletin is misleading, but its content is of considerable interest to educational psychologists. It deals with the development of courses in educational psychology from the American normal schools of 1839 to the present. Later sections survey questionnaire inquiries into the topics included in these courses, and show what wide variations exist in the relative amounts of space devoted to each topic in different books, all purporting to cover educational psychology. Special methods of instruction such as the film, and the collection of case studies by students, are briefly surveyed. The Bulletin is well documented.

P.E.V.

*Brain and Behaviour: Induction as a Fundamental Mechanism of Neuro-Psychic Activity.* By N. E. ISCHLONDSKY. London: Henry Kimpton, 1949. Pp. xv + 182. 21s. net.

The thesis of this book is that 'Every manifestation of nervous process leads, under certain well-defined conditions, to the appearance of an *opposite* process' (p. 1). After a brief review of previous work on phenomena of induction, ranging from Hering's studies of visual contrast to the work of Sherrington and Pavlov, the author gives an extensive account of some experiments of his own which are supposed to illustrate the general principle. These include studies of simultaneous and successive contrast, observations on 'thermal induction' and a long series of experiments on factors influencing various sensory thresholds. Although some of the findings are not without interest, the standards of control are uniformly inadequate and the interpretations given would seldom satisfy an experimental physiologist. Indeed the author's preoccupation with the notion of induction amounts almost to an *idée fixe* which is scarcely conducive to scientific progress. His concluding observations, relating to ambivalent and oppositional reactions in man, are in no sense novel and their interpretation in terms of a speculative 'brain dynamics' merely confuses the issue. Although Dr Ischlonsky has shown creditable initiative in developing his ideas experimentally, his book is a good example of that variety of physiological psychology only too liable to mislead the unwary and to bring the whole subject into scientific disrepute.

O.L.Z.



*Personnel Selection in the British Forces.* By PHILIP E. VERNON and JOHN B. PARRY.  
London: University of London Press, Ltd. 1949. Pp. 324. 20s. net.

Though this book does not tell us a number of things we should like to know about selection in the armed forces, as a semi-technical account of methods and results it is altogether admirable, using the opportunities of large-scale adult testing, interviewing and follow-up afforded by the war to illuminate problems common to both industrial and educational psychology. After an historical introduction and an account of the organization of selection methods in the three services, there are chapters on the various types of tests, on the interview, on some theoretical issues and on practical problems. Each chapter begins with a brief abstract of what follows and a final chapter summarizes conclusions. From these alone much valuable information can be extracted, but the discussions are worth thoughtful consideration: they are—like all the book—remarkably lucid and interesting to read. From a volume so packed with factual material it is difficult to pick out points for comment. The contact of the psychometric and field theory approaches in army officer selection procedures is interesting, as is the relation between psychologists and psychiatrists on the one hand and these professions and those whom they advised on the other hand. The contention that it is necessary to give selection methods face validity if they are to gain general acceptance, and the psychotherapeutic and moral effect which they produce when they are recognized as thorough and fair are important. It is good to have evidence that psychologists are competent to assess emotional factors and social influences and that they are not solely concerned with cognitive reactions. Two further points that attract attention are the wide usefulness of a simple test battery for *g*, *v* and *k*, combined with measures of educational attainments and information, and the striking demonstrations of the extent to which validity coefficients are influenced by selectivity.

The book is concerned only with personnel selection, but it is made abundantly clear that the development of a sound selection procedure requires the development of sound methods for assessing training progress and ultimate proficiency against which the selection can be validated.

The claims made by the authors for the selection methods developed in the services are modest. It cannot be doubted that the value of this work was immense in reducing wastage and increasing efficiency. The lessons for industrial and educational applications in peace time to be drawn from this war experience deserve the careful study of all who are concerned in these areas.

A.H.D.T.

*Therapeutic and Industrial Uses of Music: A Review of the Literature.* By D. SOIBELMAN.  
New York: Columbia University Press (London: Geoffrey Cumberlege). Pp. vii + 274.  
16s. net.

This book starts and ends well. Miss Soibelman begins her survey of the literature in this field with the laudable intention of sifting the reliable experimental evidence from the anecdotalism that is so prevalent. Her final summary is competent, and her bibliography appears to cover publications of the last twenty years or so comprehensively. In the intervening chapters the variegated nature of the material has defeated her. The result is a gallimaufry which includes accounts of laboratory experiments, physiological speculations, statistics of hospitals employing musicians, etc., interlarded with numerous such passages as: 'One physician has reported that, since installing music in his waiting room, he has found the average time taken to process a patient reduced by approximately one half.'

The penultimate chapter on music in industry is much better. There are by now many experiments indicating the conditions under which music stimulates output. It is interesting to learn, from one of the best of these, that music may sometimes produce increases in accidents.

P.E.V.

*Man, Mind and Music.* By F. HOWES. London: Secker and Warburg. 1949. Pp. viii + 184.  
12s. 6d. net.

In this book the music critic of *The Times* considers music from the standpoint of anthropology, ethics, logic, aesthetics, metaphysics, psychology, and sociology. He has an attractive style, and his sane discussion of a number of controversial issues should be of great interest to musicians. The section on psychology does not go far beyond his earlier volume—*The Borderland of Music and Psychology*. Nevertheless, his reflexions on the sense of pitch, on rhythm, musical memory and imagery, inspiration, and on the relation of the personalities of composers to their music, raise a great many problems which merit the attention of psychologists.

P.E.V.



## THIRTEENTH INTERNATIONAL CONGRESS OF PSYCHOLOGY

It is announced that the Thirteenth International Congress of Psychology, which is to be held at Stockholm, will take place from 16 to 21 July 1951.

## SECOND INTERNATIONAL CONGRESS ON CRIMINOLOGY

The Second International Congress on Criminology is to be held in Paris from 7 to 14 September 1950. The Congress is to concentrate on two main questions: first, what has been discovered in criminology during the past twenty years; second, what are the methods of research followed in the different sciences that go to make up the discipline of criminology and what results have these methods achieved? The preparatory work is being organized on a national basis and will be in the form of reports to be collated on the international plane by well-known criminologists acting as *Rapporteurs Généraux*. There will, however, be ample scope for individual less formal contributions to the discussions.

Further information and forms of application for attending the Congress can be obtained from

The Organizing Secretary in the United Kingdom,  
Second International Congress on Criminology,  
c/o Institute for the Scientific Treatment of Delinquency,  
8 Bourdon Street, London, W. 1.

## CORRESPONDENCE

THE EDITOR,  
*British Journal of Psychology.*

Dear Sir,

The otherwise admirable note Dr O. Zangwill and Dr H. Banister have sent you about John Thomson MacCurdy makes no reference to the fact that he was a religious man; and as it is no mere survey and evaluation of his professional work, but an appreciation of a general character, its omission should perhaps be repaired.

MacCurdy's interest in religion was indeed far greater than his concern for some of the other things rightly mentioned in the note. He was strongly Anglo-Catholic. He performed his duties with quiet zest, and occasionally he displayed a taste for robust argument on matters of doctrine. He was a regular communicant in his college chapel, and he received the last sacraments on his death-bed.

Yours faithfully,  
ALEC RODGER

25 February, 1950